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THE DINING HALL AT THE SEAMEN'S HOME (NOW WOMEN'S HOSTEL), ERITH

WELFARE AND HOUSING

A PRACTICAL RECORD OF WAR-TIME MANAGEMENT

BY

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WITH TWELVE ILLUSTRATIONS FROM PHOTOGRAPHS AND TWO PLANS

LONGMANS, GREEN AND CO.
39 PATERNOSTER ROW, LONDON
FOURTH AVENUE & 30TH STREET, NEW YORK
BOMBAY, CALCUTTA, AND MADRAS
1918

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PREFACE.

The circumstances of the time, and equally those which will follow the conclusion of the war, appear to demand a work such as the present, based as it is upon practical experience throughout. With no axe to grind, therefore, and solely with the desire to help those who may seek information upon the various working problems described herein, I put forward this little volume in the earnest hope that it may meet an undoubted want in an acceptable and unvarnished guise.

London, *November*, 1917.

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CHAPTER I.

INTRODUCTORY.

The results of war-time experience—Housing, catering, and canteen management—A guide to working costs—Hospital and medical arrangements—Welfare problems—Food values.

THE scope of this volume may be explained in very few words.

During the past three years I have been engaged daily in coping with the many problems which are attached to the housing of many thousands of work-people of both sexes, and catering to their manifold needs, as a result of the total dislocation which the great war has effected in the industrial life of Great Britain.

My own experience has been gained in a peculiarly wide field, for the simple reason that the firm with which I am connected—namely, Vickers Limited—happens to be the largest commercial undertaking in this country. In all it employs over a hundred thousand persons, and it has been my particular province not only to find the labour necessary to the running of the various establishments of the firm, and recruit supplies from every

available source in all parts of the world, but also to ensure the provision of adequate arrangements for their accommodation and general welfare.

The scale alone upon which, of necessity, this task has been carried out has of itself provided a basis which may reasonably be regarded as emblematic of labour problems generally. Added to the colossal numbers, however, must be the factor of immense variety, for not only are the works concerned spread all the country over, but they embrace every species of local environment and conditions, while their output embraces every type of shipbuilding and general engineering, from Dreadnoughts down to mechanism of the smallest and most precise type. There is certainly nothing too big, and hardly anything too small, to come within the purview of the firm at one place or another, and I have no just cause for apprehension lest the data which I have to set forth should be regarded as either of too limited or too special a kind, and so unrepresentative as to impair their instructive value.

It has been pointed out to me, in fact, in various influential quarters, that a useful purpose would be served if I described in practical and categorical form the methods that are employed at the numerous hostels and canteens which have been created during the war period in connection

with the Vickers factories. Many difficulties have had to be overcome, but with results that have been declared successful on all hands. Not for a moment, of course, is it to be suggested that these efforts have been unique; many firms, both large and small, have had to make provision at short notice for the housing and feeding of their greatly augmented staffs. The last thing in the world that this volume is intended to be is a superfluous panegyric of one particular firm. Nothing, however, has hitherto been published in the way of data as to practical working details and the cost of housing, catering, and other necessities of the time.

The experiences herein described are therefore put forward as a guide, primarily to those who may find themselves under the necessity of making drastic changes in their ordinary mode of business, owing to the ever-increasing requirements of the various Government departments.

In no sense, however, are the details and suggestions which will be found in the ensuing pages to be regarded as of merely temporary service, or, in other words, to be confined in their application to the period of the war. While it is true that the far-reaching demands of the Ministry of Munitions created in 1915 a sudden necessity for the provision of housing accommodation

in districts where the existing supply was unequal to the new accession of labour, and that the high pressure at which the work of munitions production had to be performed led to a practical consideration of how best the efficiency of the workers could be maintained, the exigencies of the time have brought employers generally into closer contact with the needs of the employed in respect of the factors which are essential to their health and welfare.

As a consequence lessons have been learned which will inevitably bear fruit when the war is over. The extent to which the provision of permanent housing accommodation of a satisfactory kind will remain an employer's responsibility may or may not be a matter of debate, and, in any case, the needs will vary greatly according to the district concerned and the fluctuations of the labour market when more or less normal conditions of trade have been resumed. But the desirability of canteens, as a means of ensuring the provision of wholesome food for workers who are not within easy reach of their homes, has been established beyond question, and must be regarded henceforth as a permanent feature of factory life.

Similarly, the necessity has been proved for the provision of medical and surgical facilities

within the confines of the factories themselves, in all cases where no public hospital is within measurable distance, and of a capacity equal to the emergencies which are likely to arise. The full data, therefore, which are given under their respective headings as to the cost of catering, and the most effectual ways of meeting the medical needs of the workers, will be just as applicable to large factories of every kind when the war is over as during the present period of storm and stress.

Finally, there are many questions intimately concerned with the internal life of the workshops which come under the general heading of "Welfare". These, of course, have been the subject of investigation of a most careful and elaborate kind on the part of the Health of Munition Workers Committee of the Ministry of Munitions. I have been fortunate in securing from Dr. E. Collis, the Director of the Health and Welfare Section of the Ministry of Munitions, a valuable suggestion as to the present situation and its bearing upon after-war problems, where welfare is concerned, upon which I have largely drawn in the second chapter of this volume, before entering upon an enumeration of the facts and figures which are associated with the management of the housing,

catering, and medical departments at the Vickers works.

Supplementing, moreover, the practical details as to catering and canteen management, I have received some most practical and useful data on the subject of "Food Values" from the well-known physiologist Captain M. Greenwood, R.A.M.C., F.R.S., who is statistician to the Health and Welfare Section of the Ministry of Munitions.

I also desire to express my gratitude to the Directors of Vickers Limited for giving me permission to use the data derived from the Company's resources, to the various officials of the Company who have extended their help, and also to Mr. Charles L. Freeston for his invaluable assistance in preparing the material for this volume and revising the proofs.

CHAPTER II.

WELFARE SUPERVISION.

The welfare movement born of the war—"Physiological management' a better term—How it should be carried on—Wages as an incentive to work—Lost time, controllable and uncontrollable—The need for personal tidiness—Structural conveniences—Ventilation and over-crowding—Heating and lighting—Shop cleanliness—Safety committees necessary to reduce accidents—Hints as to first aid—Efficiency appliances.

THE effect of the war, in concentrating attention upon the value of the individual worker, since a large proportion of the normal supply of labour has been withdrawn to the fighting forces concurrently with the demand for an increased output of munitions, has become a commonplace observation. And suddenly the discovery has been made, though it is hardly yet fully appreciated, that the economics of industry depend at least as much upon the capacity of the worker —a capacity which is directly proportional to his vigour and health—as upon the wages paid to him.

This discovery carries with it as a corollary that the environment and conditions of life,

which not only render possible but also maintain a vigorous and healthy staff of workers, are as much a part of successful factory management as the devising of machinery, the perfection of processes, and the fixing of rates of wages. There is rapidly springing into existence, though still rather indefinite in its methods, a branch of factory management to-day called Welfare, but which might more scientifically be known as Physiological Management.

The object of this movement is to study the worker in relation to his work and the work in relation to the worker, and it may be contrasted with what is known in America as Scientific Management, which, in its rudest forms, studies the work only as apart from the human operative who carries it out. The war has created the necessity for this movement, and necessity, which knows no law, has shown that workers employed for reasonably short hours are more healthy and vigorous, and can produce a greater output, than the same workers employed for longer hours, when they have become tired, irritable, and possibly inclined to alcoholism; that self-respect, so valuable in work-people, is more associated with such amenities of life as facilities for leaving work clean and tidy, than are high wages; that time spent

in proper attention to some slight cut proves in the long run to be time saved from a possible poisoned finger; that time lost by not commencing work before breakfast is more than counterbalanced through improved shop discipline and output obtained by rearranging the hours so that a substantial meal can be taken before work starts; and that—but the list might be continued indefinitely. The present object is to indicate how Welfare, or Physiological Management, can be carried on in factories, and indeed should be carried on, rather than to establish the necessity for it.

Firstly, the management must be prepared not only to appoint some person or persons whose whole time is to be devoted to the intricate study of the questions which arise, but also to recognise that this authority, once constituted, is as integral a part of the works management as the engineering or any other branch, and has an equal weight in the counsels of the establishment. Without this frank recognition and delegation of authority welfare supervision will and must fail, and had better not be embarked upon.

Once decided upon* the duties to be under-

* The Home Office General Order exempting, for the production of munitions of war, from the provisions of the Factory and Workshop Act, 1901, relating to hours of employment

taken by the welfare branch fall roughly into two groups, personal and structural.

I. Duties Affecting the Personality of Workers.

1. Engaging and Dismissing Labour.—The requirements of the various departments should be notified to the welfare branch, who should be responsible for engaging all labour, acting naturally in co-operation with the department requiring the labour; but the welfare branch should be responsible for seeing that the workers come up to a certain standard of general health (a preliminary medical examination is of great value; see Appendix A, p. 167), mental and bodily activity, and self-respect. This engaging of labour brings this new branch of management immediately into touch personally with the workers, a touch which should never be lost. When for any reason a worker gives notice or receives notice to leave, the fact should immediately be notified to the welfare branch, who will then satisfy themselves of the necessity, and often

of women and young persons, contains the following paragraph:—

"Employment on night shifts shall be subject to the provision, to the satisfaction of the Factory Inspector, of proper facilities for taking and cooking meals, and, in the case of female workers, for their supervision by a welfare worker or a responsible forewoman."

succeed, by adjusting some slight personal grievance, in retaining the services of the worker. By this means the wastage of workers, especially of juveniles, which to-day is, and has long been, such an economic burden to industry, though the existence of this burden has been too little recognised, has in practice been greatly reduced.

2. **Wages.**—Except in so far as the welfare branch may be able to rectify grievances which come under direct observations, the question of wages should not be a function of this branch; but, where workers are paid piece rates, a careful eye should be kept on the individual earnings. Diminished capacity for work, an early sign of fatigue and impending ill-health, may be present quite unknown to the worker, who may possibly be feeling aggrieved at receiving less and less money at succeeding week-ends, and who may be trying ineffectively to work harder when what is wanted is a short holiday to enable recuperation to take place. Diagrams can easily be kept showing the weekly rise and fall of wages earned by each worker, and a declining line should lead the welfare supervisor to interview the worker concerned.

Wages are used as an incentive to work,*

* See Health of Munitions Workers' Committee Interim Report, 1917, pages 69-84 (Cd. 8511). Price 1s. 3d.

and indeed good work should be suitably rewarded. The welfare branch, while taking no part in fixing the rate of wages to be paid, should be thoroughly conversant, if it is to fulfil its duties, with the methods of payment adopted—whether by time rates, piece rates, premium bonus system, group system, or any other plan—and should be able to explain to the workers how their wages are calculated. It is no unusual thing to find that workers do not understand how the calculation is made, and that they often fix for themselves some limit of output, under the impression that only so much can be earned whatever they do. The welfare branch may suspect something is wrong if a large number paid by some method of piece rates all earn similar wages; workers vary in their capacity like runners in a race, and their earnings should normally vary in a similar way.

3. **Lost Time.**—Time is lost by operatives for a variety of reasons, some of which are controllable and some uncontrollable, and the welfare branch should pay close attention to this subject. By this means knowledge may be obtained of the occurrence of sickness and accidents, of difficulties of transit to and from the works, of any lack of housing accommodation in the neighbourhood, of the need for a day nursery to re-

lieve mothers from domestic duties, of fatigue following upon overtime, of general discontent, and of sheer indifference among lazy workers who may advantageously be dismissed. One of the ways in which the welfare supervisor can best bring the value of her work before the management is by reducing lost time, either by exerting her personal influence upon the workers, or by effecting such changes as will lessen it, such as the abolition of work before breakfast and with it all lost "quarters".

4. **Personal Tidiness.**—Better and neater work is on the whole done by those who are neat and tidy in themselves than the reverse, and every effort should be made to encourage workers to take some pride in their personal appearance. Good sound shoes keep out the wet, and save the unpleasantness of spending the day with cold, damp feet. Even the value of a sound umbrella and of a mackintosh or reasonable overcoat should not be beneath the attention of the welfare supervisor. The wearing of overalls and caps (particularly for women and girls) is a matter which should always be decided upon by the welfare branch, not merely because this branch should best be able to advise on how to make these garments attractive and becoming. Unless these garments are made

attractive there is certain to be objection raised to them by girls who, quite naturally, do not wish to look frights.

II. Duties Affecting Structural Conveniences.

1. **Cloakrooms, Sanitary Conveniences, and Lavatories.**—"Cleanliness is next to godliness" is an old saying which may be re-written to-day as "Cleanliness is next to orderliness"; and factories owned and managed by those of higher education and intelligence should provide for those employed at least those facilities for personal cleanliness and tidiness which are to be found in elementary schools. Otherwise the training in hygiene given in the school will be looked upon by the industrially employed as some fad of the teacher's; and the factories, instead of being the means of educating its personnel, will become a direct influence to the contrary.

The effect upon the tone and character of those employed by the provision of adequate accommodation cannot be over-estimated, and orderliness and discipline go with it. When these conveniences are first introduced among workers unaccustomed to them the result is often discouraging to the management; but the

blame is not to the workers—it is rather to the management that its workers lack knowledge of the proper use to which such conveniences should be put. Here the welfare branch finds double work, first to impress on the management the necessity of making adequate provision, and then to persuade the workers to use the cloakrooms and sanitary conveniences properly and decently, and not to tear the towels, break the basins, and steal the soap. The conveniences provided should be placed under the welfare branch to supervise as regards cleanliness and order.

Certain standards should be adopted as follows. Cloakrooms should provide at least one peg for each worker placed not less than 18 inches from the next peg, and should be heated by hot-water pipes placed beneath the clothes. The clothes should not hang so that they touch the wall. The cloakroom should be under the care of an attendant, and some system of locking up should be adopted to prevent pilfering.

Sanitary conveniences must never fall below the standard set by the Home Office Order (see Appendix B, p. 177). Wherever practicable separate water-closets should be provided. In country districts where earth or pail-closets only can be installed, steps should be taken to

ensure adequate scavengering. The frequency fixed by District Councils, which may be sufficient for domestic houses, cannot be accepted as applicable to factories. One practical point calls for attention;—every sanitary plumber knows how drains frequently become blocked by an assortment of articles which should not find their way into them, particularly monthly towels. In order to avoid this, special receptacles should be placed in each convenience for their reception. Dr. Mechan, Glasgow, recommends a wooden box with a removable brown cardboard lining. This box is fixed on the wall about 5 feet 6 inches high. At intervals the cardboard lining with its contents is lifted out and incinerated in a special gas destructor. This destructor is also of use for destroying used dressings from the ambulance station.

Lavatory accommodation (see Appendix C, p. 180) should be planned for factory use and should combine simplicity with strength. Probably the best scheme is a glazed trough with spray taps and no plug, with a straight waste pipe opening over an open drain which is flush with the floor. The trough should have one tap, and be 2 feet in length for every five workers. The water supply should be ample and warm. The floor should be smooth and impervious, and

A Hospital Ward at the "D. 1" Hostel, Dartford

sloped towards the open drain. Where the workers are employed at hot processes, the spray taps should be fixed at such a height that a douche of head, neck, and arms can be indulged in. Soap may be supplied in the form of powder, jelly, or liquid. The ordinary cake of soap is not adapted for factory purposes. Small single nail-brushes are not so good as large nail-brushes specially constructed, 12 inches to 18 inches long and 3 inches to 4 inches wide, screwed into position and draining into the trough. In use the hands and nails are scrubbed against these fixed brushes. Towels are best provided in the form of roller towels giving at least 15 feet square in area for every three workers, and a supply of clean, dry towels should be placed in position before each meal interval and before the close of work.

The duty of attending to the cloakrooms, and of keeping the sanitary conveniences and lavatories clean and in order, should be undertaken by one or more persons definitely entrusted with this work, and acting under the direction of the welfare branch.

2. **Ventilation and Over-crowding.** — There is probably no subject about which more has been written that is misleading, at any rate in relation to factory conditions, than that of

general ventilation; and, with modifications, the same is true about the cognate subject of over-crowding. Within the limits of comfortable standing-room in an open field, with a light breeze blowing, over-crowding cannot occur. Close the same number of people with the same floor space within the still atmosphere of a room, and over-crowding is immediately established. Over-crowding then means imperfect ventilation, and any measure of cubic capacity of a room in relation to the persons occupying it is a fallacious standard to adopt. Improved ventilation means improved output, and more of it. The duty of regulating the ventilation of workrooms should belong to the welfare branch, and to carry out this duty the object to be attained must be understood. It is twofold,* to ensure (1) air which is pure and clean, and (2) an atmosphere which is stimulating and refreshing. Space does not permit of giving in detail how this can be best effected, but attention may be directed to a few points.

A factory shop is more difficult to ventilate than an ordinary room; heated by hot-water pipes, with no fire-place and chimney flue such as is installed in every dwelling-room, it lacks an

* Health of Munition Workers' Committee, Memorandum No. 9, 1916 (Cd. 8215). Price 1½d.

upcast shaft; work is carried on near windows to obtain light, and workers naturally, when the windows are open, complain of draughts. For this reason window ventilation should not be relied on.

Ventilation in factories is best effected by fans, opening about the centre of the room and removing or introducing large volumes of air, but in such a way as not to create draughts; and the action of these fans should not be under the control of the operatives.

Effective ventilation permits the healthy employment in a room of a larger number of persons than otherwise; but persons may be over-crowded even in an otherwise well-ventilated room, if seated in one part of the room elbow to elbow, facing others across a narrow table. Here the danger comes from personal infection, viz.: the spray from the cough of the tuberculous, or those afflicted with influenza, sore throats, or common colds. This method of seating those employed on sedentary work is far too common, and should be prevented by the welfare branch.

3. **Heating and Lighting.**—The management should delegate to the welfare branch both these questions, and the members of this branch should be continually investigating the conditions

of the workrooms. A room just comfortably warm early on a cold morning, may have become oppressively stuffy an hour later and require the heating apparatus turned off, and the ventilation increased to rectify this. Generally speaking, the means used for heating should be entirely separate from those for ventilation; and hot-water pipes, if used, are best placed high up, about 8 ft., rather than at the floor level. Gas radiators in which the burned gas escapes into the shop are to be condemned.

The character of the work should rule the temperature aimed at. Sixty degrees Fahrenheit is a good standard for sedentary work, while, for more active work, lower temperatures are reasonable and advisable, but temperatures below 50° are to be avoided. A uniform temperature throughout the shop is a thing to be avoided: variations of temperature, like moving air, if within reasonable limits, are directly refreshing.

The general lighting of the factory effected during daylight by windows and skylights is part of the structure of the building, and, therefore, hardly within the sphere of influence of the welfare branch; but, in so far as the almost domestic detail of window-cleaning is concerned, the influence of the woman is badly needed.

Windows are primarily constructed to admit light, but they cannot fulfil this function if loaded with the dirty smuts of an industrial atmosphere. By frequent window-cleaning the impression of gloom may be dispelled from the workroom, and thousands of pounds saved annually in the Kingdom from unnecessary recourse to artificial illumination, even on bright sunny days.

The welfare branch should pay special attention to artificial illumination, and particularly to the position of lights near to the work, which is more often wrong than right. The light should be so shaded and concentrated on the work that it does not fall directly on the eyes of the operator, otherwise headaches and slow work result. The whole subject, however, should be studied in the report of the Departmental Committee on Lighting in Factories and Workshops.

4. **Cleanliness of the Shops.**—All that is concerned with the order, tidiness, and cleanliness of the workshops has in the past been the province of the shop foreman, and much must still continue to be, but the welfare branch may with advantage be called upon to supervise the work of those who sweep and clean the floor.

* First Report of Departmental Committee on Lighting in Factories and Workshops, 1915 (Cd. 8000).

Foremen do not appreciate the value of damping with disinfectant before sweeping, and, having no knowledge of the microbe-carrying powers of dust, are apt to permit of dry sweeping, which is what makes spitting so objectionable.

5. **Safety.**—The provision of means such as machinery guards for preventing accidents is essentially an engineering problem, but the human influence which often determines the accident is so important (American statistics suggest that over 60 per cent of accidents are due to this influence) that the question of safety cannot be left entirely to the engineer. The causation of every accident or dangerous occurrence should be immediately investigated by a member of the welfare branch, acting together with an engineering colleague, and the welfare branch should establish safety committees composed of the operatives themselves. In every large shop the influence of such committees in reducing the accident rate is extraordinary.

6. **First Aid for Accident and Illness.**—The supervision of all provision made for rendering first aid belongs essentially to the welfare branch. A standard for such provision is now being laid down by the Home Office (see Appendix D, p. 182), and calls for aid-posts in the workrooms for the immediate treatment of slight

injuries, and a central ambulance station for more serious accidents.* An invaluable leaflet (see Appendix E, p. 185) has been issued giving directions as to the use of the appliances which must be kept in the aid-posts, and it should be carefully studied.

A trained nurse should be in charge of the ambulance station, but the welfare branch should carefully distinguish between the treatment advocated at the aid-post in the workshop and that which the trained nurse may adopt at the ambulance station. Associated with the station, especially where women and girls are employed, should also be a rest-room, containing one or more couches or lounge chairs, where any worker not feeling well can rest for a time before returning to work or going home.

The welfare branch should be responsible for seeing that

(1) the aid-posts and ambulance station are kept stocked with the necessary appliances, and that they are adequate for the purpose for which they are provided;

(2) a suitable person is in charge of each aid-post; and

* Health of Munition Workers' Committee, Memorandum No. 10, 1916 (Cd. 8216). Price 1½d.

(3) proper records are kept of every case treated.

7. **Efficiency Appliances.**—A duty devolves upon the foreman to see that every machine is in order, that the material to be manipulated is to hand, that the tools to be used are ready, and that each worker understands what has to be done; but certain facilities which promote and maintain efficiency and so postpone fatigue are frequently overlooked, and should be advised upon by the welfare branch. Thus, the chucks of a row of lathes will all be arranged at the same level, without consideration of the height or length of arm of those who are to work at them, and yet the height for convenient work for a person of 5 feet 1 inch cannot be correct for a person of 5 feet 10 inches.

Much can be done by studying each case and providing foot-boards of suitable heights. Similarly, tables and benches cannot be the best height for all, and here the abolition of benches and the provision of separate chairs of varying heights may effect a considerable increase in output. The writer has seen tall girls with bent backs sprawling over tables to which short girls on the same bench can hardly conveniently reach. For short persons tall chairs with foot-rests should be provided. On floors vibrating with

machinery the legs of the chairs should be shod with rubber to act as shock-absorbers, and the backs of the chairs should be constructed according to the posture of the worker.

There is here alone wide scope for the activities of the welfare branch. Workers who stand at their work cannot be expected to stand for eight to ten hours daily without fatigue. Moreover, at nearly every process moments come when work is not in progress. Seats should be provided for such workers to employ these moments in resting their legs, and they will do better and more work for these momentary rests. A foreman who objects to seats for his workers, because they give an appearance of slackness, is a martinet who combines ignorance of the human machine with a carelessness for the inanimate machine, the only thing of which he can pretend to have any knowledge.

CHAPTER III.

TEMPORARY HOUSING.

War emergencies—Private houses as hostels—Dormitories *v.* cubicles—Cost of furnishing—Charges to tenants—Optional agreements—Hostel administration—The bakery and laundry—Piggeries a necessary adjunct—Women's hostels—Married quarters—Belgians a special class.

A MILLION pounds, in round figures, is the sum which has been expended by Vickers Limited on the provision of workmen's dwellings. Half that amount had been devoted, long before the war, to the building up of the marine garden city of "Vickerstown," near Barrow, but the fact that a further half million has been appropriated, since 1914, to the erection of additional permanent houses in various centres, and also to the finding of very considerable temporary accommodation, affords an indication of the magnitude of the task which had to be faced at short notice after the outbreak of hostilities.

The most pressing need was that of the large and scattered district surrounding the Kentish works at Crayford, Dartford and Erith, the rapid increase in the working population being

far beyond the capacity of either the existing or newly erected houses. Early in 1915 it was found necessary to provide additional temporary accommodation for some four thousand persons. After a survey of the district it was decided to take over such public institutions as could be secured, and also a large number of private houses, and even then an area of 200 square miles had to be exploited before the want could be adequately met. Some 200 houses and institutions were acquired, at a total rental of over £23,000 per annum, with rates amounting to nearly £4500. A standard form of agreement was prepared, by which the tenancies were taken for the duration of the war and six months afterwards.

In certain cases, of course, great difficulty was experienced in obtaining possession, but the Ministry of Munitions was very helpful in bringing reluctant owners into line by means of the Defence of the Realm Act. At the same time it may be pointed out that the Ministry has no absolute power to acquire occupied premises by compulsion.

Most of the private houses, when obtained, required large sums of money to be expended upon their interiors before they could be rendered suitable for occupation by workers. At first

it was thought that the women would prefer dormitories and that cubicles would be more acceptable to the men, but experience has shown the reverse to be the case, and the women insist on cubicles, while the men do not mind, and often prefer the dormitory system.

Before any alterations were made, or the premises were taken over, a very careful schedule was prepared in each case of the condition of the houses and of the alterations required, an agreement as to these being arrived at with the landlord. For the avoidance of ultimate disputes it is very important to limit and define at the outset all that comes under the head of dilapidation at the termination of the tenancy.

The services of a house architect (Mr. E. Keynes Purchase) having been secured, a plan was prepared and agreed upon as to the most efficient and economical method of dividing large rooms into cubicles. These are made with light paper partitions, easily removable with a minimum of damage, and with curtains instead of doors.

For the furnishing of a hostel for ten boarders and a staff of two, including kitchen and dining-room equipments, the total cost may be set down at £105.

The cost of furnishing a cubicle works out in detail as follows :—

Bedstead	£0	16	10
Mattress	0	9	11
Protector	0	1	6½
Bolster	0	1	9
Pillow	0	2	11
Sheets (3)	0	8	9
Pillow-slips (2)	0	1	0
2 Over Blankets	1	5	6
1 Under do.	0	5	0
2 Towels	0	2	10
Counterpane	0	2	6
Bedside Rug	0	5	2
Chest of Drawers	1	2	6
Washstand	0	9	6
Bedroom Chair	0	3	0
Mirror	0	3	9
Toilet Ware	0	4	6
	£6	7	0

The questions of lighting, heating, and water were all carefully considered, and considerable sums of money were expended in this direction. In some instances it was found necessary to provide a pumping engine, which is also used for producing electric light, while in another case a petrol-gas illuminating system was installed. Lavatory accommodation proved a constant source of worry, the arrangements of many country houses in this respect being extraordinarily primitive. In the majority of cases, in fact, only cesspools were employed, and when the population of the houses became doubled and trebled the system was fruitful with annoyance. As regards baths, these have been

everywhere provided in the ratio of about one to every eight persons.

The house itself having been prepared, it was necessary to provide food and servants. Each house was supplied with a thoroughly efficient cooking apparatus, gas being used wherever available. A cook-housekeeper was engaged and a servant for every ten inmates. The provision and distribution of food-stuffs are dealt with in the chapter on "Catering".

Most of the houses acquired had gardens which had to be kept up, and these were rendered as prolific as possible. A staff of experienced nursery gardeners, twenty-four in number, is retained to superintend and advise, and the cost of their maintenance amounts to £1560 per annum. The estimated value of the garden produce is £300 per annum. Apart from the practical question of produce, however, it may be said that some of the large private houses acquired are surrounded by spacious and really beautiful grounds, and in point of fact enable the tenants to enjoy the amenities of a country house while themselves paying no more than 24s. a week for board and lodging.

For the purposes of management the area was divided into three districts, with a manager to each, subject to central control in London. Fre-

quent meetings of the district managers are held to discuss various points with the comptroller.

The difficulties arising from the large number of different nationalities represented by the workers have been overcome as far as possible by segregation. There are no fewer than sixteen nationalities in all, as well as three groups from the colonies. Every effort has been made to study the idiosyncrasies of each section, but the problem has none the less been complex. Even persons of a given nationality may speak in different tongues, and complete separation is advisable wherever practicable.

On the important question of charges to the tenants, it may be said that from the outset it was recognised that the scheme would necessarily entail a loss, the sole object being to provide suitable accommodation for the large numbers of work-people drafted into the district. They were offered five different options as follows :—

No. 1.—Board and lodging, including furnished cubicle or bedroom, with use of general sitting-room and dining-room, board consisting of breakfast, dinner, tea, and supper, served in the general room, or, when the employee is at work, at the canteen of the works where he or she is employed, and washing of household linen but

not of wearing apparel, with lights and heating free.

No. 2.—Furnished bedroom only.

No. 3.— do., do., or cubicle with use of sitting-room.

No. 4.—Unfurnished rooms.

No. 5.—Furnished bedroom only, with meals provided at the canteens.

When first the housing scheme was inaugurated the charges under arrangement No. 1 were as under :—

Single Men	£0	18	6	per week.	
Married Couples	1	10	0	,,	,,
Children living with parents, boys or girls, up to 8 years old	0	4	6	,,	,,
Between 8 and 14	0	5	6	,,	,,
Girls between 14 and 18	0	14	0	,,	,,
Women over 18	0	14	0	,,	,,
Boys between 14 and 18	0	14	0	,,	,,

Eventually, however, owing to the continued increase in the cost of food-stuffs, and the corresponding advance in the rate of pay received by the work-people, these charges were raised in 1917 as follows :—

Single Men	£1	4	0	per week.	
Married Couples	1	17	0	,,	,,
Children up to 8 years old, living with parents	0	6	0	,,	,,
Between 8 and 14	0	7	0	,,	,,
Girls between 14 and 18	0	18	0	,,	,,
Women over 18	0	18	0	,,	,,
Boys between 14 and 18	0	18	0	,,	,,

THE LAUNDRY AT THE "D. 1" HOSTEL, DARTFORD

A specimen of the form of agreement entered into with each hostel boarder is appended herewith :—

EMPLOYEE'S BOARD AND LODGING AGREEMENT (NO. 1).

Place.....
Works..... *Check No*.....
Name of Employee.....
Family.....
Lodging at.....
Weekly rate of payment..... .....*shillings*.....*pence*.

AN AGREEMENT made the day of 191 BETWEEN VICKERS LIMITED (hereinafter called "the Company") of the one part AND the above-named Employee now employed by the Company at the above-named place and Works of the other part WHEREBY IT IS AGREED as follows :—

1. DURING the continuance of this Agreement the Company shall provide the said Employee and the members of his family mentioned above with Board and Lodging on the terms and conditions hereinafter appearing.

2. THE Lodging to be provided shall be as described in the Schedule hereto.

3. THE Board to be provided shall consist of Breakfast, Dinner, Tea, and Supper.

4. THE said Employee shall pay for the said Board and Lodging at the weekly rate of payment mentioned above and so in proportion for any number of days less than a week on the said Employee's pay-day (being Friday in every week) to the Company's duly authorised Collector.

5. FOR the payments aforesaid the Company is also to provide furniture and light for the said Lodging and light and heating of the general sitting and dining-room, and washing of household linen, but not of wearing apparel.

6. THE meals included in the Board to be provided shall be served either in the said general sitting and dining-room or

(at times when the said Employee is at work) at the Canteen of the Works where he is employed.

7. THE Employee is to be responsible for the observance by himself and the members of his family of all regulations made by the Company for the use and occupation of the said Lodging and general sitting and dining-room and any premises used therewith.

8. THIS Agreement is determinable by either party on any pay-day by one week's previous notice and by the Company without notice if any moneys payable by the Employee hereunder shall not be paid on the day hereby appointed for payment thereof or if the Employee or any person for whom he is responsible hereunder shall commit any breach of the said regulations. And this Agreement shall be deemed to be determined without any notice if the Employee shall be dismissed from or leave the employment of the Company at the said place and Works for any reason whatsoever but no such determination shall prejudice any right of the Company in respect of moneys already owing to the Company hereunder.

AS WITNESS the hands of the Employee and the Company's duly authorised Agent.

SCHEDULE.

The Lodging to be provided under the above Agreement shall consist of :—

Furnished Cubicle or Bedroom in one of the Company's Hostels, and use of General Sitting and Dining-Room.

.....

Signature of the Employee.

.....

Witness to the Signature by the Employee.

VICKERS LIMITED.

By their duly authorised Agent.

.....

.....

Witness to Signature on behalf of Vickers Ltd.

Similar agreements in the main, with modifications according to the accommodation and charges,

were also entered into in respect of the four other options.

The largest hostel is known as "D. 1," and was originally the Dartford Workhouse and Infirmary. It provides accommodation for 500 men, and is always full. The dormitory system is employed, with sections for the different nationalities, but with a large common dining-room. As the men work on both day and night shifts the hours of the staff are necessarily very long, and begin at 5 a.m., while meals are served from 6 a.m. to 9 p.m.

Generally speaking, the men are willing to assist the management and staff in their difficult work, but occasionally grave trouble is experienced from the rowdy element. This has usually been settled, however, by representations to the leaders of the men's own social associations.

The "D. 1" Hostel is the central institute depôt, and embodies various administrative departments which are of service to all the hostels alike. There is a registration office, for example, where every worker on obtaining employment receives a card entitling him to lodging and boarding accommodation, and the staff includes an interpreter. All the bread used in the hostels and canteens is baked at "D. 1" by experienced bakers, who turn out 2500 lb. of bread per day

and 70,000 pastries. There is also a large steam laundry, electrically driven. All hostel linen and factory overalls are washed here, at charges which are much lower than those of outside laundries. The laundry staff is a very large one, and the average number of articles dealt with weekly amounts to no less than 33,000.

There is yet another department which may perhaps be regarded as novel, but has proved very successful, and, in fact, may be regarded as a necessary adjunct to any scheme of temporary housing on a large scale. I refer to the piggeries. They are of value in two ways. In the first place they contribute to economy by using up the offal from the kitchens and canteens, and, secondly, they are a source of profit, so long as a first-class breed of pigs is kept. For the "D. 1" piggeries, pedigree strains of the Vahan (black) and Albany (white) herds of Mr. S. F. Edge were bought, and have proved satisfactory in every way.

It is more profitable to breed and sell pigs than to kill and use them for bacon. Two hundred pigs are constantly being fattened at Dartford entirely on pig slosh, which is collected in specially provided tins from the various hostels. The grounds behind "D. 1" hostel are very large, and a small railway has been laid down for the

purpose of conveying the pig food to the styes, across land on which many tons of potatoes and other vegetables are grown. The pigs are sold when six months old, and it has been found better to dispose of them in London than to sell locally. It may be added that the styes are quite inoffensive, being constructed on up-to-date lines and kept scrupulously clean.

The principal women's hostel is at the former Seamen's Home, Erith, a fine old building which, with sundry interior improvements, has proved admirably adapted to the purpose. The environment, moreover, is very attractive, as the hostel is situated in a very beautiful park of 25 acres, with trees over 200 years old, and includes a spacious old-world garden with suitable modern additions. Spaciousness, in fact, is the dominant note of the place within and without, the coal-cellars being capable of holding 100 tons of coal, while the accommodation for washing and ironing clothes is particularly ample. There are 113 boarders, all in cubicles, with large dining and recreation rooms, and a number of new and special bathrooms.

No men visitors are permitted in the hostel. The chief problem which the management have had to deal with is the eradication of vermin, of which there have been many cases. In such

instances it is necessary to enjoin that the clothes should be baked, while thorough cleansing, of course, of the person and hair is essential.

Another institution which may be specifically mentioned is the Belvedere Ladies' Club at Erith. This is a new building which was originally designed as a school, but was taken over as a hostel before being used for that purpose. It is reserved for the accommodation of supervisors and other women on the office staff, and contains 60 cubicles, the inclusive charge for board and lodging being 18s. a week. The class-rooms were converted into dining and sitting-rooms, and eight bathrooms have been added.

The preparation and service of food at this hostel are rather more elaborate than at the other hostels for women, and, as it is more in the nature of a residential club than a hostel, both men and women visitors are permitted.

In the healthy neighbourhoods of Dartford Heath, Orpington, and Sidcup, a number of very large houses, with fine gardens, have been secured for hostel purposes, and it may be said, indeed, that though the 200 hostels in use are naturally of varying sizes they are pleasantly situated, as a rule, and mostly have good gardens attached.

The problem of married quarters always presents considerable difficulty in congested

areas. Few married couples elect to be boarded in the hostels, the majority preferring to take a tenement and make their own arrangements for provisions. Consequently a large number of good private houses have been converted into tenements, at Erith, Dartford, Orpington, Sidcup, and Gravesend, and each family has virtually its own flat, embodying a living-room, one or more bedrooms, and a kitchen with cooking utensils, at charges ranging from 7s. to 14s. per week.

Belgian workers require special treatment, their habits being widely divorced from those to which English people are accustomed. A Belgian family prefers to make a single room serve every imaginable purpose. All efforts to induce Belgian tenants to use a common kitchen, with a separate gas stove for each family, have failed, and they have insisted upon the gas stove, meter, and everything else being fitted in one bedroom, not even excepting the meat safe. Candidly it must be stated that their ideas are most primitive. They decline to make use of baths if provided for them, and lavatory accommodation is employed for the reception of waste vegetables, etc., constant trouble arising from this cause. A good deal of annoyance is experienced, moreover, from squabbles between the families, oftener than not on account of their

respective children. The following letter, which was recently received by the management, will serve as an example of another species of disagreement which may declare itself from time to time :—

We have to complain of the conduct of some other occupants of this house, the K—— family. We have a small piece of garden, and now they wish to dig up another piece (they already have a much larger piece than we have) and so prevent us reaching ours. In consequence of threats we complained to the police and to the agent at Erith. We were visited on Wednesday by one of your agents, and he agreed that we were in the right, and that the other piece belonged rather to us than to the K——. But, so far from taking notice of this, they have since planted cabbages and erected a barricade to prevent us crossing. As others in this house have already asked, we would like to know if it is permissible for two families to live in one room, as these two families (K—— and F——) do. This piece of ground is of very little value, but it is just in front of ours, and the only reason they want it is to cause disputes, and therefore we object to their having it, so that they will be unable to do so.

From these data it will be realised that the difficulties of dealing with Belgians are not confined alone to the question of their racial habits, for these can be conformed to in respect of allowing whole families to live, cook, and sleep in single rooms, however repugnant that may be to British ideas ; but their propensity for squabbling among themselves, when domiciled after their own fashion, makes frequent demands upon the firmness and tact of the district supervisors.

At Barrow-in-Furness the war-time developments have been more largely concerned with permanent than temporary housing, but in 1915 two hostels for single men were erected, one within 200 yards of the works and accommodating 250 men, on the cubicle system. The building is of brick and fireproof throughout, the cubicle partitions being of special corrugated steel. The ground floor is wholly taken up by the dining-room, kitchens, laundry, lavatories, bathrooms, etc. This hostel cost £7000, and is operated by a small limited company in which Vickers Limited hold a controlling interest. The second hostel is of timber, and affords the ordinary comforts expected by the navvy type. It has sleeping accommodation for 100 men, with cooking and other conveniences.

For single men who prefer the comforts of a private house the company has altered and furnished a large house in Barrow, and it is now the Bankfield Boarding House, and sleeps eighty men. It is very popular among the colonial workmen, of whom there is a large number in the works. The cost of conversion was £1000, after paying which the firm handed the building over to private enterprise, subject to a measure of control as to prices.

Female labour at the outset was chiefly

recruited from girls living at home, but, as a result of the extended scale upon which women are diluting or supplementing male labour, a large number of girls arrived in Barrow from other towns. A hostel was therefore erected on Walney Island, and holds 110 girls. It is well furnished and suitably equipped throughout, with recreation, reading, and writing-rooms adjoining the main building. The total cost, excluding land, was £3500.

CHAPTER IV.

PERMANENT HOUSING.

The marine garden city of Vickerstown—How to start a housing scheme—Co-operation with the Rural Housing Organisation Society necessary—Successful results in North Kent.

WHEREVER the housing accommodation of a given district is inadequate in volume or unsuitable in kind, the erection of new permanent dwellings on a scale commensurate with the probable normal establishment of a given factory is manifestly advantageous to employers and employees alike. The experience of Vickers Limited in this respect has been, if not unique, at least out of the common run, as, apart from war-time developments, they had built up a marine garden city, now well known as Vickerstown, before the war. The "city" is self-contained on the eastern shore of the Isle of Walney, and separated from Barrow-in-Furness by the tidal water of the Walney Channel, but connected with the mainland by a modern bridge, 1123 feet in length and 50 feet in width, with a tramway service.

Since the war, however, the personnel of the Barrow works has been increased by 10,000 men and 6000 women, and within two months of the outbreak of hostilities the Company foresaw that a scarcity of houses was bound to arise. Already they were the owners of a thousand houses, or about one-fourteenth of the whole town of Barrow, but took steps to have 150 cottages erected for their own account, and, by financial inducements to speculative builders, secured the erection of 120 others close to the works. By the time the 150 were under way the plan was extended, and 250 further cottages were ordered to be erected. At the close of 1915, therefore, the Company had seen to the erection of no fewer than 520 modern cottage houses, each containing three bedrooms, as well as two rooms on the ground floor. It soon became evident, however, that even this total was insufficient, and during the summer of 1916 ninety additional houses were put up, thus bringing the figures to 610 in all, where new buildings were concerned, at a cost of £150,000.

The task was materially facilitated by the fact that these developments were all made practically on one site, which was of itself, moreover, large enough to allow expansions of this kind. An undulating park of 7 acres, elaborately laid

out, forms a central feature of the landscape, the houses being built on the north and south sides. They are as far removed from the "barracks" category as could well be imagined, for not only are they picturesque structures in themselves, with gables, half-timbered fronts, and charming windows, but they are also separated by spacious streets. These bear the names of war-ships that have been constructed at the Vickers shipbuilding and armament works on Barrow Island.

Vickerstown already contained its own churches and schools, two bowling-greens and tennis-courts, an institute, a reading-room, a billiard-room, a public hall, a library, a fire station, and an hotel conducted on the Earl Grey Trust system. Since the war, however, the list of institutions has been considerably increased. The Company erected in a central position a theatre, complete with full stage, dressing-rooms, boxes, etc., and providing seating accommodation for 700 people. A new institute was also set up, with reading-rooms, card-rooms, billiard-tables, etc. Several acres of land were appropriated for allotments, and were fenced off into kitchen gardens with iron railings, tool-houses of pretty design being also provided. The gardens are let to the workmen at nominal rentals.

So successful on social and moral grounds had the trust system of management proved during the twelve years' experience of the "King Alfred" hotel that a second was erected—the "George"—to meet the requirements of the hundreds of new cottages, and is provided, like its predecessor, with a bowling-green and two tennis-courts. Both hotels are operated by the Walney Public House Trust Co., Ltd., a company whose dividends are limited, as is usual with "trust" establishments, to a maximum of 5 per cent. Any surplus beyond this is paid to the trustees for distribution amongst local charities, hospitals, nursing associations, recreation clubs and the like. The sale of intoxicants is in no way forced. The cost of these new developments was as follows: Theatre, £10,000; institute, £3000; garden allotments, £1000, or with the cost of the land, £1500; and public house, £6500.

Vickerstown, of course, must be regarded as a special case, and where the circumstances do not permit of the building-up of a self-contained garden city of such a kind or magnitude it is advisable to enlist the aid of the Rural Housing Organisation Society. The *modus operandi* is as follows: "Not fewer than seven persons must apply in writing to the Registrar of Friendly

Societies for registration under the Industrial and Provident Societies Act. Before the rules they propose can become operative they must receive the Registrar's certificate. Such registration, however, does not of itself constitute a society of public utility unless the rules include a restriction of interest on capital by which not more than a net 5 per cent can be paid. The statute governing this matter is the Housing and Town Planning Act, 1909. The advantage of becoming a public utility society under the said Act is that two-thirds of the capital required can be obtained on mortgage from the Public Works Loan Commissioners."

It may be added that before the Commissioners grant a loan they have all plans and specifications examined, and satisfy themselves that the building will be of a sufficiently substantial character to carry a mortgage for thirty or forty years. They also retain rights of inspection for purposes of maintaining a healthy and lettable condition of the property, and they always impose a rent limit. No money is actually paid to a society by the Commissioners until the houses are completed and have been inspected and valued by their officials.

As regards the remaining one-third of the capital, this is provided by those who are inter-

ested in the scheme, and willing to take up membership and to invest in the society's shares and loan stock at a reasonable rate of interest. The voting power is held by those who provide the means, control being proportionate to the financial stake involved.

The tenants have, in practice, security of tenure irrespective of employment. So long as a tenant pays his rent, and is not a nuisance or a danger to his neighbours, he can remain in occupation of his house, as also may his children after him. This practice is not due to any statutory power, but to the principles of the R.H.O.S. movement. Under war conditions, however, the Public Works Loan Commissioners are making no further loans except for supplying houses for workers engaged in producing war material, and it is not practicable to ensure security of tenure save to actual war-workers, but when the war is over the normal system will prevail.

Such, in brief, were the lines on which the Crayford Cottage Society, Limited, was established, after Vickers Limited had invited the co-operation of the Rural Housing Organisation Society, and no fewer than 589 cottages, on an estate of 60 acres, have been erected under the scheme. Of these there are 308 which are

THE KITCHEN AT THE "D. 1" HOSTEL, DARTFORD

let at a weekly rental of 8s. 6d., 186 at 9s. 6d., 15 at 9s. 9d., 29 at 10s., 34 at 10s. 3d., 16 at 10s. 6d., and one at 11s. 3d. Labour and materials having increased enormously in price since the war, the total cost of the estate has been £206,200, including the land, the making of roads, and development expenses. Dividing the total named among 589 cottages, the cost for each works out at about £350, but there is still some portion of the estate to be developed.

The Company have also erected 400 similar cottages on the Northumberland Heath Estate at Erith. The estate comprises 40 acres of land, which was originally an orchard, and a large number of the fruit trees have been left in the garden of each house. The cost of the first 200 houses, including land, compensation, building, fencing, planting, site-clearing, roads, drainage, and development fees, was roughly £336 each. The second 200 cost £376 each, the difference being due to the increase in the price of labour and materials. There is also a workshop and estate office, which cost £668. As at Crayford, the rents vary according to the positions and size of the gardens, and range from 8s. 6d. to 11s. per week.

The cottages at Crayford and Erith are of five different types, but each contains a living-

room, parlour, scullery, and three bedrooms. Lighting is by electricity, and cooking by coal or gas. A bath, with a fixed water supply, is provided in every case. According to the independent testimony of an architect of peculiarly wide experience in this class of work, the building has been carried out in a very satisfactory way, and he is of opinion that the Rural Housing Organisation Society is to be congratulated on the excellent results obtained. The interior arrangements of the cottages, moreover, are declared by another expert to "show considerable advance upon some of those which have been erected in recent years, and the manner in which every inch of space has been brought into service compels admiration".

It should be added that the houses are not more than ten or twelve to the acre, and the windows of the living-rooms have all a south or westerly aspect, while the provision of allotments, open spaces, and sports grounds gives much more room for fresh air and sunshine than is possible under the old methods of crowding as many houses as possible to the acre. Wide thoroughfares have also been provided; in fact, in some of these the cottages do not front each other at a less distance than 60 feet, and between these healthful conditions, com-

bined with cheerfulness of aspect, and the standards that have done duty in working-class districts generally in the past, the contrast is as remarkable as it is pleasing.

It would have been natural to expect, perhaps, that under the stress of war-time emergencies the working classes might have had to put up with overcrowding and all manner of other evils. In some places this state of things may actually have been recorded, but in the main the fact that the necessities of the situation, from the productive point of view, have compelled employers to make special efforts has had the effect not merely of bringing increased accommodation into being, but accommodation of a superior kind. In the preceding chapter we have seen how single men and women may be boarded in country houses, with adjoining parks or spacious gardens, at a charge of 24s. a week. This may or may not prove to be a phase of the war period alone; but in the districts above described, as doubtless in many others, the war has ensured a permanent improvement in the conditions under which the workers live and move.

CHAPTER V.

CATERING.

Hints as to detail management—The food bill—Travelling women inspectors—Accurate costing necessary—Monthly tabulation—A sample trading account—The question of dietary—Daily and weekly consumption—Men's *v.* women's appetites—Variety in diet—Sample menus—A suggestion as to communal kitchens—The avoidance of waste—The value of fat—Hostel vouchers—The payment of boarding accounts—Difficulties of debt collecting.

If the provision of housing accommodation, at short notice, for several thousand people was a problem of some magnitude, scarcely less formidable and important was the task of providing them with food. Large numbers of them, as will have been seen from Chapter III, preferred to be boarded on inclusive terms, rather than cater for themselves, while there was also the question to be faced of providing meals within the factories themselves, by means of canteens. It follows, therefore, that the developments in this connection have been unusually extensive, and after three years of practical experience I think that I may be able to furnish sundry hints on detail management which should be of service to those who have yet to travel on the samelines.

The first necessity was to establish a catering department, of which Mr. R. H. Glasspool is the comptroller. If all the hostels had been centred in one spot, or even grouped in bunches, central kitchens and dining-halls would have been established, but owing to the scattered nature of the district these were impossible. There was also the case to be considered of the single men, who could not readily feed themselves, as there were no public food places within the vicinity of the hostels.

With hardly any exceptions, all provisions are purchased in the London markets, the prices being checked against the official list published weekly by the Board of Agriculture. To give an idea of the quantities dealt with I may state that the total amount of food purchased in one month amounted to the value of £7972 6s., the main items being as follows :—

Meat	£2602	19	8
Bacon	722	15	0
Flour	176	8	0
Vegetables	97	15	6

A fleet of motor-vans conveys the food from London to "D. 1" or other hostel centres. It is then checked, weighed, and apportioned to individual hostels and canteens. A close watch is kept on the cost of feeding per head at each hostel, and the costs are prepared and analysed, and

submitted to the manager each month. From the figures it can be seen at once whether any hostel is consuming undue quantities of food. This comparison, of course, is not only invaluable but absolutely necessary. The costs are given in terms of "cost per head per week, as to individual items" and "total cost per head per week," including overhead rent, rates, taxes, wages, etc. A staff is maintained of experienced travelling women inspectors, who are sent out to investigate the causes of any evidences of inefficiency which may be disclosed.

The importance of accurate costing cannot be too strongly insisted upon, especially when the magnitude of the operations is borne in mind. Owing to the number of headings and columns involved it is impossible to give here an actual reproduction of a specimen page of the monthly tabulations of receipts and expenditure in connection with any one hostel, but the system of classification may be set forth as follows :—

Date. Number of issue note. Number of boarders. Number of staff. Fresh meats. Cooked meats. Ham and bacon. Fish. Potatoes. Other vegetables and fruits. Flour. Bread, cake, pastries, etc. Eggs. Butter and Margarine. Cheese. Sugar. Tea. Milk. Coffee and cocoa. Other food-stuffs. Meal vouchers. Total food-stuffs. Cleaning sundries. Coal and Coke. Renewals. Electric light and gas. Petty cash. Wages. Sundries. Total expenditure other than food-stuffs. Grand total. Credits.

Beneath the vertical columns under these

headings are spaces for details under the following side headings :—

"Stock on hand on morning of the first day. Less stock on hand at end of period. Total consumption. Total consumption for corresponding period last year." In the extreme right-hand bottom corner of the sheet are spaces for "Percentage this year" and "Last year" respectively.

The trading account of each hostel is also analysed in the following manner :—

HOSTEL TRADING ACCOUNT.

.....weeks ending.....

DISTRICT.....NAME OF HOSTEL.....

Average Number of Inmates. Average Number of Staff.

Cash receipts for Board and Lodging.

	Average Cost per Inmates per Week.	Average Cost per Boarder per Week.
Less food.....		
Wages.....		
Cleaning.....		
Coal and coke.....		
Petty cash.....		
Gas (proportion).....		
Rent („).....		
Rates and taxes (proportion).....		
Renewals.....		
.....		
Profit or loss £.....		

Average cost of food per inmate per week £

Average cost of food, wages, cleaning, coal and coke, petty cash per boarder per week..... £

Average total cost per boarder per week... £

The question of dietary is naturally one of great importance, and has already been the subject of two successive reports on the part of the Health of Munition Workers' Committee of the Ministry of Munitions. Professor Leonard E. Hill, M.B., F.R.S., and other physiologists appear to agree that persons engaged in medium work require about 3500 calories per diem, and Professor Hill has suggested an ideal ration for summer conditions, as follows :—

		Ounces Daily.	Pounds Weekly.	Calories Daily.
Bread		12	5¼	935
Meat		12	5¼	779
Auxiliaries	Sugar	1¼	⅝	171
	Other foods			
	Cereals	21½	9⅜	1397
	Margarine			
	Cheese, etc.			
	Cocoa and milk	7/10	⅜	225·7
Total				3507·7

This dietary is altogether greater than that laid down by Lord Devonport when Food Controller, but his scale did not apply to munition workers. As a matter of fact the average consumption of food at the Vickers hostels shows an even higher percentage of daily calories than that of Professor Leonard Hill's ideal dietary. Pending the preparation of the Munition

Workers' Committee's second report I was asked to furnish data with respect to the "D. 1" Hostel, and these were dealt with in the report named in the following manner :—

The erection of hostels, required on account of the inadequacy of pre-existing accommodation for housing the suddenly increased personnel of certain large munition factories, has afforded an opportunity of investigating the whole daily dietary of operatives. The investigation was made at a well-managed hostel where each worker may eat as much as he or she desires. In a dining-hall there are separate tables for men and women ; and by weighing the food supplied to a definite number at given tables, and by weighing the uneaten residue, the cost of each ingredient being known, the management obtained the cost price of food per week, and found it amounted, in March, 1916, to 15s. 2d. per man, and 11s. 9¾d. per woman, or 0·8 that for a man, a ratio in agreement with that stated above.* The amounts of protein, fat, carbohydrate present in the food consumed were estimated by two schemes :—

(*a*) The management weighed the amount of each type of food supplied throughout the day to—

(i) six men
(ii) six women

and deducted the amounts unconsumed. The amounts of protein, fat, and carbohydrate present were determined at the laboratory from known data.

(*b*) The hostel was visited personally, and the amounts of all the most important constituents of the menu actually eaten by a large number of persons were weighed ; the average daily ration consumed per person was calculated from these data, and then samples of the food-stuffs were analysed as above.

The results obtained by these two schemes, which closely agree, are set out in the following tables, III and IV :—

*In tables based upon inquiries made in various canteens.

TABLE III.

Hostel Daily Dietary Per Man.

(Calculated from Data Supplied by Management.)

Meal.	Ingredients.	Weight in Grammes.			
		Gross.	When Dried.		
			Protein.	Fat.	Carbo-hydrate.
Breakfast .	3½ oz. bacon .	110	25·3	47·0	—
	½ „ butter .	14	3	11·3	—
	6 „ bread .	170	12·0	2·0	89·4
	1 „ sugar .	28	—	—	28
	½ pint milk .	80 c.c.	2·5	3·0	4
	1 oz. jam .	28	—	—	14
Dinner .	7 „ fish .	200	36·2	1·0	—
	8 „ potatoes	228	4·0	—	55
	3 „ bread .	85	6·0	1·0	44·7
	8 „ pudding	228	7·3	9·3	70
Tea . .	1 „ sugar .	28	—	—	28
	1 „ butter .	28	0·6	22·6	—
	4 „ bread .	114	8·0	1·4	60
	½ pint milk .	80 c.c.	2·5	3·0	4
Supper .	4 oz. meat .	114	37·6	3·5	—
	1 „ butter .	28	0·6	22·6	—
	1½ „ pickles .	43	—	—	5
	6 „ bread .	170	12·0	2·0	89·4
All meals .	—	—	152·9	129·7	491·3
Calorie value: total .		3847	626·9	1206·2	2014·3

The food consumed by women similarly worked out gives a total of 3070 calories.

TABLE IV.

HOSTEL DAILY DIETARY PER MAN.

(Data Obtained by Personal Visit.)

Meals.	Ingredients.	Dry Weight in Grammes.			Calories.
		Protein.	Fat.	Carbo-hydrate.	
Breakfast .	Sausage . . .	6·3	8·2	12·2	1020·9
	Bacon . . .	15·1	30·5	—	
	Bread . . .	12·1	8·4	96·7	
Dinner .	Meat . . .	42·7	4·0	—	973·8
	Potatoes . .	3·7	—	50·6	
	Cabbage . . .	2·5	—	9·5	
	Apple pie . .	5·3	21·2	66·3	
Tea . .	Bread, butter, and jam . . .	13·8	9·6	111·6	603·4
Supper .	Bread, butter, ham, and cheese . .	44·6	55·8	96·0	1097·4
Total		146·1	137·7	442·9	
All four meals—all kinds . .		599·0	1280·6	1815·9	3695·5
Sugar and milk used in tea not included in above .					218·0

The calorie values obtained by these two analyses, 3847 (Table III) and 3913 (Table IV) approximate closely; they should satisfy the requirements of factory workers, unless very heavy work is being done, and could perhaps be reduced somewhat if facilities for getting extra food are afforded to anyone who wants more. Excess food either passes into useless adipose tissue (fat) or is imperfectly utilised and impairs the digestion and efficiency.

The average amount of food consumed per man in the Vickers hostels and canteens may

be further illustrated in other ways. The following table, for example, shows the quantities per day and per week under fourteen headings :—

	Per Day.		Per Week.	
	oz.		lb.	oz.
Meat	12·143		5	5·00
Bacon	2·119			14·83
Sausages	1·143			8·00
Fish	5·047		2	3·33
Bread	15·857		6	15·00
Sugar	2·286			16·00
Eggs	2·000	(four per week)		8·00
Margarine	2·000			15·40
Potatoes	8·000		3	8·00
Greens	4·000		1	12·00
Sweets	8·000		3	8·00
Cake	2·000			14·00
Jam	2·000			14·00
Pickles	1·000			7·00
4 cups of tea per day with sugar and milk.				
	4 lb. 3·595 oz.		29 lb. 4·56 oz.	

As may be realised at a glance, the consumption of meat is remarkably heavy, and, if bacon and sausages are included, amounts to nearly 1 lb. per day per man. Almost identical are the figures concerning bread.

Other tables may be usefully quoted as showing the total food consumption under all headings at the chief men's and women's hostels during a period of one week. The table relating to the men's ("D. 1") hostel is appended :—

HOSTEL FOR MEN.

Number of men receiving	Breakfasts	1478	During week ending June 30th, 1917.
	Dinners	1282	
	Teas	742	
	Suppers	239	

Number of women receiving	Breakfasts	308	During week ending June 30th, 1917.
	Dinners	392	
	Teas	393	
	Suppers	308	

Food purchased for week ending June 30th, 1917, at a total cost of £328 16s. 7d. :—

Butcher's meat	2621½ lb.
Bacon	995 ,,
Sausages	—
Tinned meat	48 lb.
Bread	2262 ,,
Flour	152 ,,
Oatmeal	32 ,,
Margarine	246 ,,
Lard	—
Biscuits	—
Cakes	34 lb.
Jam	244 ,,
Marmalade	114 ,,
Coffee	66¼ ,,
Cereals	—
Custard powder	21 lb.
Butter beans	2 ,,
Macaroni	1 ,,
Baking powder	1 ,,
Rice	15 ,,
Green vegetables :—	
Greens	19 bags
Watercress	17 bunches
Lettuces	176
Tomatoes	80 lb.
Spring onions	12 bunches
Carrots	—

Turnips	25 dozen
Potatoes	8 cwt. 3 qrs. 9 lb.
Cheese	104½ lb.
Eggs	741
Milk	143 pints
Condensed milk	6 tins
Dried fish	—
Fresh ,,	125 lb.
Dried fruit	53 ,,
Fresh ,,	73 ,,
Cocoa	¼ ,,
Sugar	388 ,,
Tea	120 ,,
Golden syrup	34 ,,
Salt, mustard, pepper	26¾ ,,
Vinegar	23½ pints
Sauce	30 bottles
Sardines	2 pints
Pickles	1 pint
Pineapple	7 tins
Peas	22 ,,
Soup	1 tin
Nutmegs	1 ,,
Mixed	4 packets
Plums	1 bottle
Salmon	3 tins

TIMES OF MEALS.

	Week Days.	Sundays.
Breakfast	6 to 9 a.m.	7 to 9 a.m.
Dinners	12 ,, 4 p.m.	1 ,, 2.30 p.m.
Teas	6 ,, 9 ,,	4 ,, 5 ,,
Suppers	6 ,, 9 ,,	6 ,, 8 ,,

The following table shows the purchases for one week at the former Aged Seamen's Home, Erith :—

HOSTEL FOR WOMEN.

Number of men receiving	Full board	2	During week ending June 30th, 1917.
	Breakfast, dinner, tea	Nil	
	Dinner, tea	„	
	Dinner	„	

Number of women receiving	Early breakfast (tea, bread, and butter)	359	During week ending June 30th, 1917.
	Breakfast	397	
	Dinner	246	
	Tea	226	
	Supper	391	

Food purchased for week ending June 30th, 1917, at a total cost of £40 10s. 1½d. :—

Butcher's meat	254 lb.
Bacon	147 „
Sausages	—
Tinned meat	—
Bread	162 lb.
Flour	30 „
Oatmeal	—
Margarine	20 lb.
Lard	—
Biscuits	—
Cake	4 lb.
Jam	14 „
Butter	1 „
Marmalade	14 „
Green vegetables :—	
Radishes	4 pennyworth
Parsley	6 „
Greens	2 bags
Lettuces	8 dozen
Watercress	12 bunches
Carrots	Nil
Onions	14 lb.
Turnips	—
Potatoes	224 lb.
Cheese	7 „

Eggs	170
Milk	23½ gallons
Dried fish	Nil
Fresh „	14 lb.
Dried fruit	23 „
Also 1 bottle of plums	
„ „ tin pineapple	
Fresh fruit	15 lb.
Cocoa	¼ „
Sugar	44 „
Tea	16 „
Coffee	2 „
Pickles	1¼ gallons
Vinegar	½ „
Condensed milk	13 tins
Tomatoes	8 „
Mustard, salt, pepper	8¼ „
Butter beans	1 lb.
Tapioca	1 „
Pearl barley	4 „
Lentils	2 „
Split peas	3 „
Blue peas	6 „
Haricot beans	8 „
Powders—baking	1 „
custard	3 „
egg	½ „

TIMES OF MEALS.

Breakfast	7 to 9 a.m.
Dinner	1 „ 2 p.m.
Tea	4.30 „ 6 „
Supper	7 „ 9 „

Notwithstanding the discrepancy between the food actually consumed, as per the foregoing tables, and the ideal dietary suggested by Professor Leonard Hill, it has been found impossible

PROVISION STORES AT THE "D. 1" HOSTEL, DARTFORD

ANOTHER CORNER OF THE PROVISION STORES AT "D. 1" HOSTEL

to reduce the food consumption by voluntary effort in the hostels, and any attempt at lowering the supply has resulted in outspoken objection. It is amazing to note how much some men will eat, but the women, as will have been seen, usually eat 20 per cent to 25 per cent less than men.

Quantity apart, however, it is important to vary the dietary as far as possible. The workers prefer a cut from the joint, and view made-up dishes with suspicion. The latter, notwithstanding, are essential to food economy. English cookery does not excel in the preparation of made dishes, and the probable reason why they are not popular is because they are not sufficiently "tasty".

To illustrate the extent to which variety is practised at the Vickers hostels I reproduce the daily menus for a complete week, as served at the two hostels above mentioned :—

Name of Hostel, "D. 1" Hostel (Men). Week Ending June 30th, 1917.

Day.	Meals.			
	Breakfast.	Dinner.	Tea.	Supper.
Sunday.	Porridge. Eggs & bacon. Cold ham.	Steak & kidney pie. Roast beef. Roast lamb. Cabbage, potatoes. Gooseberries. Rice, Semolina.	Tea. Bread. Margarine. Jam.	Cold ham. Tongue. Roast beef. Roast mutton.

Day.	Meals.			
	Breakfast.	Dinner.	Tea.	Supper.
Monday.	Porridge. Bacon & tomatoes. Cold ham.	Mutton chops. Boiled ham. Roast mutton. Irish stew. Cabbage, potatoes. Peas, fig pudding. Pineapple custard.	Tea. Bread. Margarine. Jam.	Cold ham. Curried mutton. Rice. Roast beef.
Tuesday.	Porridge. Bacon & tomatoes. Cold ham.	Roast veal & bacon. Steak & onions. Cabbage, potatoes. Jam pudding. Sago ,,	Do.	Cottage pie. Stewed beef & onions. Cold beef. Cold ham.
Wednesday.	Porridge. Cold ham. Liver & bacon.	Stewed veal & peas. Roast beef. Roast mutton. Cabbage, potatoes. Stewed figs. Custard.	Do.	Cottage pie. Curried mutton. Cold mutton.
Thursday.	Porridge. Eggs & bacon. Cold meat.	Boiled veal & parsley sauce. Roast beef. Steak & kidney pudding. Turnips & potatoes. Pineapple, rice.	Do.	Stewed veal & peas. Cold roast, veal, and bacon. Roast beef and ham.
Friday.	Porridge. Veal & ham rissoles. Cold ham.	Suet pudding & jam. Boiled beef. Dumplings. Roast mutton. Cabbage, potatoes. Raisin pudding. Stewed fruit & custard.	Do. Watercress.	Fried fish. Boiled beef. Roast ,, Ham. Mutton.
Saturday.	Porridge. Bacon & tomatoes. Cold ham.	Irish stew. Boiled ham. Roast beef. Roast mutton. Cabbage, peas. Potatoes. Date pudding. Stewed fruit, rice.	Do. Cake.	Shepherd's pie. Cold ham. Cold beef.

Name of Hostel, Seamen's Home (Women). Week Ending June 30th, 1917.

Day.	Meals.			
	Breakfast.	Dinner.	Tea.	Supper.
Sunday.	Tea & coffee. Bread & margarine. Egg & bacon.	Haricot mutton. Cabbage, potatoes. Tapioca pudding. Stewed fruit. Tea, bread.	Tea. Bread & butter. Jam, Marmalade. Lettuce. Watercress.	Tomato soup. Cold ham & beef. Potatoes. Pickles. Cheese. Bread, butter. Tea, coffee.

Day.	Meals.			
	Breakfast.	Dinner.	Tea.	Supper.
Monday.	Tea & coffee. Bread & margarine. Egg & bacon.	Roast beef. Roast potatoes. Cabbage. Gooseberry tart. Stewed apricots. Custard, tea. Bread.	Tea. Bread & butter or jam. Marmalade.	Thick gravy soup. Cold lamb. Mint sauce. Potatoes. Salad. Cheese. Bread, Tea. Coffee.
Tuesday.	Do.	Roast veal & ham stuffing. Peas, potatoes. Gooseberry tart. Tea, bread.	Do.	Scotch broth. Cold veal & ham. Fried potatoes. Cheese. Pickles. Tea, coffee. Bread.
Wednesday.	Do.	Roast beef. Cabbage. Potatoes. Baked jam roll. Tea, bread.	Do.	Tomato soup. Cold beef. Cottage pie. Potatoes. Pickles. Bread, tea. Coffee.
Thursday.	Do. Bacon & tomatoes.	Stewed veal & parsley sauce. Cabbage, potatoes. Bread pudding with raisins. Custard, tea. Bread.	Do.	Thick gravy soup. Cold beef. Pickles. Fried Vegetables. Cheese. Bread, tea. Coffee.
Friday.	Do. Cold ham.	Roast beef. Cabbage. Potatoes. Date pudding. Tea, bread.	Do.	Vegetable soup. Cold veal & ham. Cold beef. Potatoes. Pickles. Cheese. Bread. Tea, coffee.
Saturday.	Do. Bacon & tomatoes.	Veal & ham pie. Steak pie. Boiled cod & parsley sauce. Haricots, potatoes. Marmalade pudding. Boiled custard. Tea, bread.	Do. Watercress.	Lentil soup. Cold ham & beef. Potatoes. Pickles. Bread, butter. Tea, coffee.

While dealing with the question of food consumption, I may mention that in February, 1917, I ventured to address sundry suggestions to Lord Devonport in the following terms :—

FOOD CONTROL.

It appears to me that the difficulties of controlling the consumption of food are almost insurmountable, as whatever regulations are made they can be broken by persons who wish to evade them.

It further appears to me that the effect of attempting to control the consumption of food is at the best a temporary war measure, and is not one that will have lasting effects upon the welfare of the nation as a whole, especially upon the working classes.

It is an admitted axiom that the usual methods employed now of cooking food are wasteful, and in many instances detrimental to health.

It appears to me that the best solution of the difficulty is to attack the vast problem at the other end, that is, by improvement in the cooking and preparation of food. It is admitted that some nations, notably Belgians, French, and Italians, are particularly skilful in preparing nourishing food from material that is wasted in this country to a very large extent. The science of cooking is not studied in this country, especially among the poorer classes, and, although I am aware that some very minor attempts have been made to give instruction, they are far from universal.

I suggest that in order to obtain this desirable result :—

1. The services should be obtained of a number of persons who have *practical* first-hand knowledge of economical cookery. This Committee should consist in part of Belgians, French, and Italians, who could no doubt be found in this country, and in part of English persons who have studied the question. In my opinion, with very few exceptions the English managers of large hotels, restaurants, cooks in large private houses, and similar persons have not the requisite experience.

2. An experimental laboratory should be at once set up with advisory chemists who have made a study of food-stuffs, and an advisory medical man who has made a similar study, the whole in charge of a competent cook who has had a wide experience in the preparation of food-stuffs.
3. In addition to the publicity which would have to be very thorough and given daily in all the newspapers and by means of pamphlets, I suggest that communal kitchens should be set up throughout the United Kingdom, provided with special cooking utensils where persons could have their food brought to be cooked, and where also lessons could be given to housewives.

The advantages of the foregoing scheme appear to me as follows :—

A. That the experience derived from the laboratory and from the communal kitchens could be disseminated to all persons concerned.

B. Benefits derived would be of a permanent nature, not solely a war measure, and would be bound to be to the advantage of the community as a whole for all time, improving the health and stamina of the nation.

C. In the event of a radical diminution of the consumption of food-stuffs being found necessary, the communal kitchens would form a ready means of distribution under the absolute control of the Food Controller.

These suggestions, it may be added, have since been adopted in part by the Ministry of Food and the Ministry of Munitions.

Every effort should be made in hostels to bring down waste to the irreducible minimum. All broken bread should be collected from the tables and sterilised at a temperature exceeding 67° Cent. (121° Fahr.), and may then be used in puddings or in made-up dishes. Cold meat and

scraps must be made up and utilised. The bones can be rendered down for stock, and afterwards may be sent to the piggeries, where they are again boiled up with the other food. What are left can be sold, and are used for carbonising purposes in engineering works and in the preparation of artificial manure.

Fat is a very valuable food, yet few will eat it. In most kitchens the proper conservation of fat results in a larger supply than can be used. At the Vickers hostels large quantities of white dripping are sold at 7½d. to 8d. per lb. A good deal of dripping is used for frying purposes, and becomes brown fat, which is not suitable for eating; it is therefore sold with what are called rough fats and bits of bone at 1½d. per lb. The dripping as sold includes the meat juices that filter through and form a jelly at the bottom of the dish.

Two further questions attaching to hostel management remain to be dealt with. The first is the method of dealing with those boarders who may prefer to take some of their meals at the canteens. For this purpose they are provided with "hostel vouchers" for breakfast, dinner, tea, and supper, of which samples are reproduced herewith:—

Series No. 5.

BREAKFAST VOUCHER

Issued to

.....

Date.....

Series No. 5. *Date*.....

To the Canteen, Crayford.

Voucher for one
BREAKFAST.

Available for day of issue only.

Worker's No.

.....

Stamp of Hostel.
Issuing Voucher.....

Series No. 5.

DINNER VOUCHER

Issued to

.....

Date.....

Series No. 5. *Date*.....

To the Canteen, Crayford.

Voucher for one
DINNER.

Available for day of issue only.

Worker's No.

.....

Stamp of Hostel.
Issuing Voucher.....

Series No. 5.

TEA VOUCHER

Issued to

....

Date.....

Series No. 5. *Date*.....

To the Canteen, Crayford.

Voucher for
one TEA.

Available for day of issue only.

Worker's No.

.....

Stamp of Hostel.
Issuing Voucher.....

Series No. 5.

SUPPER VOUCHER

Issued to

.....

Date.....

Series No. 5. *Date*.....

To the Canteen, Crayford.

Voucher for one
SUPPER.

Available for day of issue only.

Worker's No.

.....

Stamp of Hostel.
Issuing Voucher.....

These have a face value of 9d., 1s., 6d., and 8d., respectively, and the canteen receives credit accordingly for each one presented. At first these vouchers were sold and sometimes gambled for, and it therefore became necessary to make them non-negotiable and available for one day only.

The other question is that of the payment of boarding accounts. In a migrating population many bad debts accrue; in fact, they average £500 a month in the North Kent region. Under the Truck Act it is illegal to deduct from wages the charges for food unless it is prepared and served under the employer's "roof," and in any case the money cannot be recovered for food served to men's wives and families.

The process of recovery is therefore very difficult and slow. If a man refuses to pay, and a County Court summons is issued, it is not heard for six weeks, and even then an order may be made for payment at the rate of only 10s. per week. It is almost impossible for a firm to obtain an ejectment order so long as a man is in its employ, no matter how disgraceful his conduct may have been.*

* Since this was written the hostel agreements have been divided into two parts: (1) lodging and attendance, (2) food. The cost of the former is recoverable from the lodger; the cost of food is recoverable by stoppage from the wages under the Truck Act by means of the agreement specially entered into in advance with the employee. This has considerably reduced the bad debts.

CHAPTER VI.

CANTEENS.

A permanent feature—The ideal canteen—An architect's suggestions—Structure and equipment—Requisites for a canteen for 600 persons—The importance of quick service—500 meals in twenty minutes—Scrupulous cleanliness essential—Paid *v.* voluntary workers—Food at cost price—Payment by vouchers only—Sample menus.

ALTHOUGH the provision of canteens in munition works has come about as a war-time emergency, in some cases because new factories have been erected on sites far removed from shops or even dwellings, it may be taken for granted that they will remain a permanent feature of the average large works even after peace has been declared. Even though motor transport may eliminate the element of distance to an appreciable extent, it is inevitable that some, at least, of the employees will live too far away to make it possible for them to go home daily for their dinner. There may be cases, too, where the local circumstances are such, in respect of housing accommodation, that no hostels have had to be established, which

nevertheless render the provision of canteens a boon.

They ensure, in a word, the advantages of a liberal meal of good and well-cooked food, at a low price, and instantaneously served when needed, with the enjoyment of a considerable period of relaxation before the hour is closed, as against the drawbacks of a double journey, absorbing, perhaps, half the dinner hour, and the hasty consumption of a probably inferior meal; added to which there is the potent fact that in many cases there is no one at home to prepare a meal at all, as the workers themselves are the householders concerned.

Despite the array of hostels in such large numbers, and the facilities for motor transport, at the Vickers works in North Kent a very complete equipment of canteens has also been provided, and they are the means, in fact, of supplying as many as 100,000 meals per week, quite apart from those served in the hostels themselves.

In the Crayford canteen as many as 1250 persons can be served at one time, while three of the canteens at Erith and the Dartford "No. 5" have each a seating capacity of 600. Altogether, as many as 4650 workers can be supplied with food at the canteens in the North Kent district.

Canteen accommodation is also provided, of course, to the full requirements of the case at the firm's various other factories throughout the country. At the Ward End works, Birmingham, there is a men's dining-hall with a seating capacity of 1100, and a women's dining-hall seating 1450, while the total accommodation in this district is for 8762 persons. At Barrow-in-Furness there are sixteen canteens accommodating 4471 persons in all. Other canteens are provided at all the other works.

For the following practical hints on the construction of a canteen I am indebted to Mr. E. Keynes Purchase, F.R.I.B.A., who designed, among others, the "No. 5" at Dartford, which has come to be regarded as a model of its kind.

"In the design for a canteen there are a number of points to consider in order to ensure good working condition and economical results.

"Under the circumstances at present prevailing the selection of material is an important consideration. The use of steel has to be avoided as much as possible, and good serviceable timber is practically unobtainable. The main structure can be classified as 'permanent,' or what is at present generally known as

'temporary,' but the cost of the latter now so nearly coincides with the cost of a permanent building that the only real advantage gained by the erection of a temporary structure is the time saved in its erection, and this is very often an important factor.

"I suggest an intermediate course, and will endeavour to describe a canteen which could be considered as permanent, but avoids as much as possible the use of materials which are now difficult to obtain.

"**Structure.**—The foundations should be of concrete or brick, and the walls can be built with breeze blocks or hollow terra-cotta blocks. If breeze is used it will have to be rendered on both sides, but if terra-cotta hollow blocks are adopted, the outside can be coated with a good waterproofing transparent liquid and the inside pointed with a neat joint. This saves all plastering, and if the blocks are of a good colour the effect is quite pleasing. Bricks are now becoming more difficult to obtain. The work would take longer to execute, and unless the walls were built hollow the outside—especially in exposed situations—would have to be coated in a similar manner to the terra-cotta blocks. Again, a brick finish inside is not so pleasing nor comfortable looking as the terra-cotta blocks, so

that plastering would probably have to be resorted to.

"In the roof we have to consider the saving of timber and also steel. Under present conditions, and now that timber has become so scarce, I think a light steel trussed roof is the quickest and best to adopt. The only timber then required would be purlins of fairly small scantling, fixed about 4 feet apart, with small common rafters, battens, and slates. The inside of the roof, if lined with asbestos sheets, makes a very good finish, and is an excellent substitute for wood owing to its fireproof qualities. Ample light by means of windows and skylights should be provided. I strongly recommend fixed ventilation in the form of Boyle's and other approved ventilators.

"A cement floor, covered with thick Lino, forms a very good, clean finish when time can be allowed for the cement to dry before the Lino is laid, or as an alternative a wood floor covered with Lino.

"**Plan.**—This should be carefully considered, and it is essential that the service should be central and easily get-at-able, to avoid confusion when a rush is on, and also to ensure the food being served up hot. It must not be forgotten that a canteen differs from an ordinary

restaurant or eating-house, as the work-people only have their dinner hour available, and consequently as many as 500 meals have to be dispensed in a very short time.

"**Kitchen, etc.**—When practicable I would place the kitchen in a central situation, with a good long service counter in front with serving tables and hot closet behind, so that the work-people, after they have obtained the ticket for their meal at the entrance, can present it at the kitchen counter and take their portion to the table with the least possible crowding or inconvenience.

"**Heating.**—If the canteen is of a temporary nature and required only for war work I would use gas radiators, but for permanent use I would provide hot-water or steam pipes, and the boiler for this could be accommodated in the same house as the boiler for the hot water for kitchen use.

"The kitchen should be of ample dimensions, light, and well ventilated. When gas is available it is preferable to coal for cooking, but it is not economical for heating water, which should be done with a small boiler.

"Convenient and ample storage must be provided for provisions, vegetables, and butcher's meat well under the control of the manager,

with an approach for van or cart which does not interfere with the working of the canteen. A continuous supply of hot water is provided on the counter, so that customers can help themselves and make their own teas, etc.

"If the situation is such that accommodation is not procurable in the neighbourhood, the staff must be provided for by the erection of cubicles or bedrooms, with a suitable sitting-room attached. As the canteen will most probably at some time be used for night workers, it is advisable to provide living accommodation for the manager, so that he may always be available and on the spot.

"**Lavatory Accommodation.**—This is amply provided for in the works, and is therefore not necessary, but good accommodation should be provided for the staff.

"In conclusion, I would say that it is always difficult to make a canteen pay its way; good food and plenty of it must be served in order to satisfy customers, and therefore it is essential that everything possible is done to ensure quick service and economical arrangements to enable the canteen to be run on as small a staff as possible."

It is necessary to enter into still further detail as to equipment, and the following list of

requisites, based upon three years of practical experience of canteen work, may prove of service to those who may be addressing themselves for the first time to the task of catering to a large number of employees :—

EQUIPMENT REQUIRED FOR A CANTEEN WITH ACCOMMODATION FOR 600 PERSONS AT ONE SITTING.

TABLES.—6 ft. × 2 ft. 6 ins. × 3 ft. high, covered in white American cloth. This can be easily and quickly washed, and is a saving of labour and wear and tear.

CHAIRS.—Bentwood, if possible, with plain hard seats which can be washed easily.

LIGHTING.—Electric or gas incandescent.

CASH DESKS.—One on each side of entrance for taking cash for bills, or the issuing of tickets for cash, according to system in force in canteen.

OFFICE AND MANAGER'S ROOMS (to be near entrance).—Small office with tabling, usual office equipment and stationery. Bedroom, plainly furnished. Sitting-room plainly furnished.

KITCHEN.—To be placed in the centre of the canteen to give a quick service, and it should be open to the dining-room.

The following would be required :—

Serving Counter about 38 ft. long and 2 ft. wide. Top to be of white hardwood, which can easily be kept clean by washing.

Under the counter two shelves to be provided for storage of cups, saucers, etc., for convenience in serving.

Two 10-gallon *Urns* (block tin) to be placed in centre of counter, and heated by steam or gas rings of sufficient power. These urns to supply all hot water required for making tea, coffee, bovril, etc.

Note.—Experience has shown that the patent continuous hot-water boilers become very quickly corroded, are frequently out of order, and constantly give trouble. They require frequent repair and cleaning out, particularly if the water is hard.

Carving Table, fronting the counter, with sunken hard metal-cutting dishes and covers, and hot closet underneath fitted with two shelves for keeping food hot; the whole to be heated by steam or gas.

Hot Closet with three shelves for keeping plates, etc., hot, steam or gas heated.

Five *Gas Coast Cookers,* with gas rings and grills on top for boiling, toasting, etc.

Four *Blackpool Boilers* (14 gallons), galvanised

body, tinned copper, with galvanised wire baskets for cooking soups, vegetables, hams, etc. Steam or gas.

Two *Steam Cookers*, each with four compartments with shelves and wire baskets, for the steaming of potatoes, fish, meat, and puddings in quantities. One 14-gallon wrought steel oval pot with lid and draw-off tap for stock. If obtainable, copper-lined tin would be better.

One 12-gallon do.

One 7-gallon do.

Tables. One 12 ft. × 2 ft. 6 ins., with teak wood ends for chopping purposes.

One small side table near counter for clean plates, cups, and saucers to help in quick service.

One 12 ft. × 2 ft. 6 ins. for cutting bread and butter, cake, and preparing teas.

Six *Porcelain Sinks* with hot and cold-water tap over for washing of all vegetables.

Scullery.—A good hatchway from dining-room into scullery for the passing through of all dirties.

Long Counter on same level as hatchway 2 ft. wide, with shelves underneath for clean crockery, glass, etc.

Teak Sinks. Six of good size, opposite hatchway, for washing-up crockery, glass, and kitchen utensils.

Hot and cold-water taps over sinks.

Note.—Teak is better than porcelain for glass and crockery, as it reduces the breakages.

Rows of plate-racks over sinks.

LARDER AND PREPARING ROOM.—For meat, pastry making, etc.

Slate slab counter on one side.

Long wood counter on other side, 2 ft. wide, with zinc-lined drawers underneath for keeping bread, cake, etc.

This room should be well ventilated and cool.

REFRIGERATOR OR SMALL COLD STORAGE PLANT.—For keeping meat, fish, milk, etc.

STORE ROOM.—For groceries and dry goods.

To be well ventilated and dry, with eight galvanised iron bins with covers for holding cereals, flour, etc. Strong shelves all round room. Open wooden bins on part of floor space. Sloping from back to front, for holding potatoes and other vegetables, etc. Rods and hooks for hanging hams, bacon, etc.

STAFF LAVATORIES AND DRESSING-ROOM.—Fixed

porcelain washing basins with hot and cold water supply.

Three W.C.'s.

Hat and coat hooks.

FLOORS in kitchen, scullery, larder, stores, and preparing room should be granolithic, with rounded edge where meeting wall to prevent collection of dirt.

Walls in these rooms to have 5 ft. dado of tiles or coloured bricks.

SELLING BAR.—Space to be allocated near entrance or kitchen with counter for sale of cigarettes, tobaccos, cigars, mineral waters, non-alcoholic beers, sweets, chocolates, pies, biscuits, fruits, etc., etc.

Counter with lock-up cupboards and sliding doors underneath. Shelves at back for display of goods.

Other requisites may be enumerated as follows :—

50 meat dishes.
150 teapots, earthenware (2 pints).
150 do. do. (4 do.).
3000 white unchippable cups and saucers (about half-pint).
5000 meat plates, white earthenware.
1000 soup plates.
1000 small plates (6 ins.).
500 pint jugs.
250 sugar basins.
144 pudding basins.
1500 half-pint tumblers.

1500 nickel knives and forks, with no shoulder between handle and blade, plain handles (not ribbed).
1500 nickel dessert spoons.
1500 nickel teaspoons.
12 each carving knives and forks.
6 cook's knives.
6 „ forks.
6 steels (12 ins.).
150 salts
150 mustards } in nickel or enamel, all separate.
150 peppers
288 bone mustard spoons.
288 „ salt „
12 ladles.
12 enamelled jugs (1 gallon).
36 large enamelled pie dishes.
200 small enamelled moulds for puddings.
12 large enamelled bowls.
6 enamelled milk pails with lids.
4 milk barrels with lids for counters.
200 small enamelled moulds.

Linen.

24 dozen glass cloths.
12 „ roller towels.
24 „ dusters.
24 „ swabs.
24 „ kitchen cloths.
1 „ kneeling mats.
1 roll of house flannel.
6 table cloths.
12 serviettes.

24 saucepans (various sizes).
1 meat chopper.
1 meat saw.
12 colanders.
6 galvanised iron baths.
6 fish kettles, with strainers 24 ins. × 18 ins.
12 bass brooms.
12 mops.
36 scrubbing brushes.

1 Avery's platform weighing machine to weigh up to 5 cwt.
1 pair steps.
1 tea measuring machine (fixed to supply 64 portions to the lb.).
1 staff time recorder.
2 bread cutting machines.
1 bacon „ „
1 incinerator.
10 galvanised tins with lids for offal.
12 scoops for groceries.
24 potato peelers (if not using potato peelers, washing and cutting machine worked by electricity or hand).
Staff overalls.
12 rolling pins.
24 strainers.
50 trays.
24 wire sieves.
24 fish slices.
36 iron spoons.
36 wooden spoons.
24 frying pans.
1 knife machine.
24 iron pails.
6 dust bins.
12 tin openers.

Day Staff Required.

1 supervisor and bookkeeper.
2 cashiers.
1 storekeeper.
1 chef.
1 second cook.
2 vegetable cooks.
3 washers up.
12 waitresses, bar hands, and cleaners.

As regards management, it may be said at once that the prime essential of canteen efficiency is quick service. Apart from the desire for food, the workers value every minute of the interval between one spell of work and the next, and are not content unless they can be served as soon as they have entered the mess-room. Five hundred meals can be served in twenty minutes in "No. 5" Canteen at the Dartford Works, and this, in point of fact, is the amount of time which the employees usually devote to their repast, after which they adjourn to the outer air. In the interests of their own digestions it would be better if they devoted a few more minutes to the meal itself, but at least they have no cause of complaint as to any lack of expeditiousness in the serving, nor, for that matter, as to the quality of the food or of the cooking.

Too much importance can hardly be attached to the question of scrupulous cleanliness in canteen management, both in front and behind. Nothing could be more disgusting than dirt and cockroaches; anything of the kind is entirely without excuse, and denotes bad management and a slovenly staff.

Paid workers are far better than voluntary helpers, in the light of Vickers experience, and this conclusion is borne out by the findings of

the Ministry of Munitions Committee which was set up to inquire into the subject.

Some of the canteens are open both day and night, but it must be admitted that these are more uneconomical than the one-shift ones, and with the former it is found difficult to make both ends meet.

On the question of expenses, I may aver that the object of canteens should be to provide adequate, wholesome, and substantial food at *cost price.* Canteens should not make a profit, nor a loss, save in the case of double-shift ones and those which are provided for girls working short shift and not earning high wages. The latter must and should show a substantial loss. Women just as much as men must have good food, and there is nothing worse for them than a "glass of milk and a bun," on which they cannot possibly do good work.

In passing it may be mentioned that the tea interval has proved its value to all concerned. Data, in fact, which were taken by the Home Office as to the power consumed in workshops as representing output, established the benefit of teatime to an unmistakable degree.

The total cost of equipping the "No. 5" Canteen was £286 14s. 6d., exclusive of anything included in the building arrangements, such as

sinks, etc. The cooking apparatus, heaters, etc., were as follows :—

	£	s.	d.
5 No. 1300 coast cookers	107	10	0
2 „ 1339 steamers	44	10	0
2 carving tables and hot closets	46	10	0
4 boilers, each 14 gallons capacity, galvanised body, tinned copper pan. Each with galvanised wire baskets	18	0	0
1 W.R. 303 "Duplus" boiler	20	10	0
3 W. 432 iron-clad water-heaters			
3 capsules			
3 W. 10 stands 24 ins. high	17	9	6
	£254	9	6

Other items were as follows :—

	£	s.	d.
2 Imperial bread-slicing machines at 35s. each	3	10	0
Incinerators £5 10s., less 10 per cent discount	4	19	0
Running gas supply in ¾-in. barrel, galvanised 3 in. flue pipe and necessary fittings	4	10	0
3 wrought steel oval pots at £3 3s. 6d. each	9	10	6
1 12-gallon ditto	2	7	6
3 7-gallon ditto at £1 6s. 6d. each	3	19	6
3 wire strainers for 24-in. oval iron pans at 6s. each	0	18	0
Scales and weights	1	0	6
Weighing machines	1	10	0
	£32	5	0

No money should be taken over the counters. At the Vickers canteens small pay-boxes are established at which tickets may be bought for cash. These tickets have a face value from ½d. to 6d., and are exchanged for food at the

counter. A dinner of meat, vegetables, and sweet is obtained for 11½d., the average amount of meat served in one portion being 4 oz. cooked. The following are specimens of the daily menus at the men's and women's canteens respectively :—

MEN'S CANTEEN.

Soup	Thick Mulligatawny	2½d.
Entrée	Minced Lamb and Green Peas	8½d.
Hot Joint	Roast Sirloin of Beef	8½d.
Cold Joint	Ribs of Beef	8½d.
	York Ham	8½d.
	Pressed Beef	8½d.
	Lettuce Salad	2½d.
Vegetables	New Potatoes	1½d.
	Baked Beans	1½d.
Sweets	Blanc Mange and Jam	3d.
	Stewed Figs and Rice	3d.

Glass of Milk, 2d.
Pickles, 2d. Cheese, 2d. Chutney, 2d.
Bread, ½d.
Tea, Coffee, 1½d., 2d.
Horlick's Malted Milk, 2d.
Home-made Lemonade, 1½d. per glass.

WOMEN'S CANTEEN.

Soup	Thick Mulligatawny	2½d.
Entrée	Minced Lamb, Green Peas, and New Potatoes	8½d.
Hot Joint	Roast Sirloin Beef and Two Vegetables	8½d.
Cold Joint	York Ham	5d.
	Rib of Beef	5d.
	Pressed Beef	5d.
	Salad	2½d.

Vegetables	New Potatoes	1½d.
	Heinz Baked Beans	1½d.
Sweets .	Blanc Mange and Jam . . .	2½d.
	Stewed Figs and Rice . . .	2½d.

Cup of Tea, 1½d. Minerals, 3d.

Somewhat extraordinary is the way in which some employees will remove the Company's goods, such as knives, forks, plates, etc. This is not done because of their intrinsic value, but for convenience of use. Periodical searches have to be made in the lockers, etc., throughout the works, and the majority of the missing articles are usually recovered.

CHAPTER VII.

FOOD VALUES.

A three-fold purpose—Fuel value *v.* tissue-building—Proteins and calories—Methods of inquiry—Experimental and statistical data—The use and abuse of alcohol—Meat extracts do not supply energy—Rope in bread—British *v.* imported meat—Beer as food "a fond delusion".

THE objects of eating and drinking are:—

(*a*) To supply energy enabling the body to do work.

(*b*) To repair the wastage of the tissues due to wear and tear and, in children, to build them up.

(*c*) To gratify the senses. Some articles of diet, such as meat, perform all these functions, others, such as sugar, only two of them, viz. (*a*) and (*c*); yet others, such as pepper and mustard, only one (*c*).

For scientific purposes, the value of a food depends upon its importance with respect to the function (*a*) which we may call its *fuel value*, and with regard to the function (*b*) which we may term its *tissue-building value*. The fuel value of a food can always be measured exactly, and the tissue-building value can in most cases

be likewise measured. There are, however, certain substances essential for tissue-building the food value of which cannot be expressed numerically.

These are bodies of unknown chemical composition present in uncooked fruit, green vegetables, etc., which are necessary for life and health although the exact amounts necessary are quite unknown. Their provision becomes of urgent importance when we cater for persons who must largely depend upon preserved foods—soldiers campaigning in countries where local supplies are inadequate, or sailors on long voyages—but in the present connection we need merely say that a supply of raw fruits, salads, etc., is of more importance than a mere knowledge of food values in the narrow sense would suggest. A similar remark applies to inorganic salts, such as table salt; deprivation cannot occur under any conditions conceivable in a civilised European community.

There remains, therefore, for consideration the measurable fuel and tissue-forming values of ordinary foods. The tissue-forming value of a food is measured in terms of the amount of protein it contains. Proteins are very complex organic bodies containing carbon, hydrogen, oxygen, nitrogen, usually small quantities of

sulphur, and in special cases phosphorus. The reason why the tissue-forming value of a food is measured by the amount of protein it contains is that the animal body can only replace losses of protein within its own tissues from protein given in the food. A diet containing no protein might be palatable, but could not support life. Protein is present in greater or less amounts in all animal and vegetable foods as such. The chief animal source is ordinary meat; corn and other cereals are the main vegetable sources.

The fuel value of a food is measured in terms of the number of heat units liberated in its combustion. The ordinary unit is the large calorie, now usually termed simply the calorie, being the amount of heat required to raise the temperature of a kilogramme of water one degree centigrade. This unit is chosen because all manifestations of energy can be expressed in terms of heat energy; thus we can measure the work done when a weight is lifted against gravity through a certain height in terms of calories, or, conversely, we can measure a number of calories in terms of the equivalent amount of work.

Proteins can be used as fuel, and two other classes of food-stuffs, carbohydrates (starches and sugars) and fats have also great value as fuels. From this point of view, carbohydrates and

proteins have about equal values, while fat is more than twice as good a fuel as either. This is to say that, when equal weights of the three substances are burned, fat will yield more than twice as many calories as protein or carbohydrate. We thus see that, while it would be possible to live on a protein diet—*plus* the imponderable necessities mentioned above—because protein is both a tissue former *and* a fuel, the other foods are *only* fuels.

To determine the amounts of tissue-forming and fuel food necessary, two methods of inquiry have been adopted. The first is to determine by experiment how much of the foods is required to maintain a person of ascertained age and weight, following a definite routine of work or rest, in good health and without his sensibly losing or gaining weight. The second method is to compile statistics of the quantities consumed by persons in ordinary life, doing different amounts of work and able to choose freely their own diets.

Each method has its advantages and disadvantages. The experimental method is, in the individual case, the more accurate, but, because it involves great skill and the employment of elaborate apparatus, can only be employed in an absolutely small number of instances, so that

the results are averages of small numbers liable to be influenced by individual peculiarities. The statistical method can deal with much larger numbers of observations, so that the error due to personal idiosyncrasies is minimised; but, on the other hand, considerations apart from those of tissue forming or fuel value have great influence upon the choice of diet in everyday life. Obvious factors are price (normally animal food is more costly than vegetable food) and climate; the widespread use of rice in oriental countries is due to ease of production, while national prejudices have to be remembered.

On the whole the most valuable data we possess, both experimental and statistical, have been collected by the officers of the United States Department of Agriculture, which has issued a long series of bulletins describing the results of observation and experiment in America. These bulletins, which are very clearly written, should be studied by all interested in the subject. Such a study would have enabled the English reader to assess, at their proper value, some of the extraordinary statements published in the English newspapers and elsewhere in this country during the last eighteen months.

The most important *experimental* observations, nineteen in number, cover a period of sixty-

Exterior of One of the Dartford Canteens

The Kitchen of No. 5 Canteen, Dartford

five days and relate to three adult males. When the subjects were at rest, i.e. did no more work than was involved in dressing and undressing, reading and writing, etc., about as much as a man sitting in an office and taking no exercise, it was found that the average fuel value of the food was 2636 calories and the protein value 112·5 grammes. On this, health and weight were maintained. Experiments were also made on the effect of work, this usually consisting of driving a stationary bicycle belted to a small dynamo for eight hours a day. The idea was to do a moderate day's work. To maintain health and weight very little change of tissue-forming value was required, but the fuel value had to be increased by about 1000 calories.

The averages (for two of the three subjects) in the work experiments were 107·5 grammes of protein and 3584 calories; taking a single person, it was found that his values in the rest experiments were 117·5 grammes protein, 2681 calories, and in the work experiments 121·87 grammes of protein and 3770 calories. During the rest experiments, this subject lost a little protein and put on a few grammes of fat. During the work experiments he gained a little protein and lost about 44 grammes of fat. On the basis of such experiments as these, the observers

concluded that an adult doing sedentary work would require daily about 100 grammes of protein and a fuel value of 2700 calories. For light, moderate, hard, and very hard work respectively, the standards were 112 and 3050, 125 and 3500, 150 and 4500, and 175 and 5500.

The accompanying table, which summarises many observations made by this group of workers using the statistical method, will be seen to agree tolerably well with the scale inferred from

TABLE I.—AMERICAN STATISTICS.

	Grammes per Head Daily.			Fuel Value. Calories.
	Protein.	Fat.	Carbo-hydrates.	
Very Hard Work:—				
Maine Lumbermen . .	182	337	812	6995
Bavarian Lumbermen .	130	292	724	6015
American Football Teams .	226	354	634	6590
Labourers in Cronstadt Dock	220	95	931	5603
Miners in Tomsk (maximum)	281	66	1075	6174
Miners in Tomsk (minimum)	248	55	965	5482
Hard and Moderate Work:—				
Mechanics' Boarding Club in Illinois . . .	117	146	379	3390
Mechanics at Connecticut .	106	142	406	3420
,, ,, Indiana .	90	134	408	3285
,, ,, Tennessee .	110	210	412	4090
,, ,, New Jersey .	100	138	425	3435
Sedentary Work:—				
14 Professional Men's Families (U.S.A.) . . .	104	125	423	3325

the experimental results. In the scale nothing is said as to the allocation of carbohydrates and fats to be used in the diet; it is merely assumed that sufficient of these will be given to bring the total fuel value up to the prescribed amount. We see that the statistical results reveal wide divergences in the amounts of fats and carbohydrates in the diets. The proportion in normal times and Western communities is regulated by the economic status of the persons observed. Fat is costly itself, and foods rich in fat (see Table II.)

TABLE II.—COMPOSITION OF COMMON FOOD-STUFFS.

	Per Lb.			Energy Value per lb. Calories.
	Protein. Grammes.	Fat. Grammes.	Carbo-hydrates. Grammes.	
Beef	68·0	81·65	—	1039
Bacon	43·0	272·2	—	2708
Pork	45·36	181·46	—	1874
Bread	36·29	5·4	238·1	1176
Flour	52·17	4·56	340·2	1651
Cheese	113·4	136·0	11·3	1777
Rice	36·29	1·36	358·3	1631
Peas, etc., dried	108·8	6·8	272·2	1626
Jam and Marmalade	2·7	0·45	226·0	945
Sugar	—	—	444·5	1822
Condensed Milk	43·5	42·2	49·8	780
Cocoa	90·7	117·9	192·8	2259
Chocolate	36·29	95·25	281·2	2188
Butter	4·5	384·5	—	3600
Margarine	5·44	381·1	—	3566
Eggs	54·4	43·1	—	624
Milk	15·4	18·1	22·7	325
Fresh Fish	45·4	4·5	—	228

are also dear. This is the principal reason why the poor man's diet contains so much less fat than the rich man's, and also explains why the statistically observed diets of sedentary workers are more generous than the theoretical scale.

An interesting illustration of the distribution of energy values is contained in Table III., which gives a selection of the results obtained by the Food Investigation Committee of the Ministry of Munitions in their study of consumption of food in hostels for munition workers. It will

TABLE III.—MUNITION WORKERS' HOSTEL VALUES, 1917.

Hostels.	Grammes per Head Daily.			Fuel Value. Calories.
	Protein.	Fat.	Carbo-hydrates.	
A . .	110	113	415	3205 (2885)
B . .	102	91	465	3095 (2786)
C . .	159	204	392	4135 (3722)
D . .	105	128	366	3124 (2812)
E . .	69	70	296	2183 (1965)
F . .	126	171	351	3548 (3193)
G . .	98	119	364	3023 (2721)
H . .	125	131	436	3711 (3340)
I . .	117	110	396	3199 (2879)
J . .	96	127	292	2728 (2455)
K . .	115	137	428	3660 (3294)
L . .	133	156	477	3951 (3556)
M . .	146	244	386	4446 (4001)
N . .	119	114	463	3475 (3128)
O . .	102	123	283	2813 (2532)

be noticed that the energy and protein requirements of the theoretical standard are about

reached in most cases. (It is to be noted that when diets are given in terms of food as purchased, the fuel value of food actually eaten is at least 10 per cent less than the amount tabulated, on account of waste.)

This is assuming the diet to be a mixed one. The proportion is very small indeed with such foods as bread, and considerable in the case of meat. The quantities of fat eaten are far above the normal allowance of English working class families. The consumption having been reduced, and that of meat and margarine increased, the experiments and statistics just described are representative of the majority of the observations which have been published, and the standards deduced are those accepted by the leading writers on food values.

It cannot, however, be said that the interpretation placed upon them is universally accepted by scientific critics. By more than one physiologist it has been maintained that the quantities of protein prescribed are excessive, and that even the energy values are unnecessarily high. It is undoubtedly true that cases have occurred where health and strength were maintained for long periods upon meagre diets.*

* For instance, two adult women who were fruitarians appeared to thrive on diets, the fuel values of which (in forms

It is also a fact that some important questions of dietetics are still unresolved. For instance, we can determine very accurately what fraction of the energy value of the fuel supplied to a heat or internal combustion engine can be transformed into work; this is what engineers call efficiency. We know that heat engines, such as the steam locomotive, working at practically possible temperatures of boiler and condenser, cannot transform much more than a quarter of the fuel value of the coal supplied into work, and actually do not usually transform nearly so much.

Similar determinations of efficiency upon a living engine are extremely difficult to make. We know, indeed, that the efficiency is, relatively to a steam engine, high and that it varies greatly from person to person. But, owing to the experimental difficulties in the way of making measurements, it is quite impossible to determine the amount of food necessary for the performance of a definite task with the precision that could be attained when we are dealing with inanimate mechanism.

Clearly the point is of considerable im-

of man values) were respectively 2765 and 1850, the protein values 80 and 36 (U.S. Dept. Agriculture, Experimental Stations, Bulletin No. 107).

portance, and it is probable that wide differences in the amounts of food consumed by different persons doing the same work reflect intrinsic differences of efficiency of their bodily mechanisms. It is also possible that, by training, the quantity of food, whether of fuel or tissue-building value, needed by any individual can be greatly reduced.* At present, however, we do not know enough to enable us to lay down the laws of such training. We can merely say that the standards of values quoted above should be aimed at by those who regulate dietaries, but that they ought not to be regarded as final ; here, as in all departments of science, there is ample room for further research.

Assuming, then, that a food diet has to be framed on the general lines of the American standards, a few special considerations remain for notice. We have given quantities assumed to be required for adult men under the different conditions of work stated. The proportional quantities required for women and children are shown in Table IV., which has been adopted, following the American workers, by the Food Committee of the Royal Society. It is possible

* We mean that the cells of the body might be habituated to use the fuel supplied more economically and so be kept in health on a lower diet.

TABLE IV.—VALUES FOR DIFFERENT AGES AND SEXES.

Ages.		Man Value per Head.
0 to 5		0·4
6 to 9		0·5
10 to 13		0·6
14 and 15	Males	0·8
	Females	0·7
16 and over	Males	1·0
	Females	0·8

that the reductions for children and adolescents are too great, but this also is a matter not yet definitely ascertained. The ratio of men to women has been found in practice to give satisfactory results.

Next, as to the choice of articles of diet providing the necessary values. The reader is aware that the normal desire of one human being to regulate and interfere with the conduct of his fellow-creatures' lives finds its widest satisfaction in the matter of eating and drinking. At all times the amount of nonsense written and spoken, by advocates of this or that diet, is prodigious; in war time the sum total of nescient eloquence evoked by the phrase "food values" staggers the imagination. With most of this we have, fortunately, no concern, but we must refer to one or two popular fallacies.

One is with regard to alcoholic beverages.

This subject is fully discussed in the recent report of the Scientific Committee appointed by the Central Control Board (Liquor Traffic); all that we need say here is that, while alcohol is undoubtedly a food, in the sense that it has a considerable fuel value, it is greatly modified by other properties altogether alien to the subject of catering. In real life hardly anyone takes alcohol because of its food value, although the innate desire of Englishmen to find reasons for doing what they like to do impels many of us to give the food value as a reason. Consequently the use or abuse of alcohol is no real part of a discussion of food values; it is enough to say that the fuel value of alcohol can easily be obtained from many other articles of food, the use of which does not involve the difficulties associated with excisable commodities.

Finally it may be noted that, although agreeable sensations experienced in consuming food are of great practical importance, so that it is not scientific but silly to argue that A is a better food than B because its fuel and tissue-forming values are higher, when A happens to be far less palatable than B; yet the opposite error of attributing food value to articles which happen to be palatable is equally grave. This remark applies with especial force to the widespread

use of meat extracts. The gross exaggerations of claims made on behalf of these substances by the vendors, and generally believed by the public, have often been exposed by scientific men. An investigation recently carried out under the auspices of the Food Investigation Committee of the Ministry of Munitions throws much light upon the matter. This investigation, which was made at my suggestion by Dr. Lane Claypon, has shown conclusively that meat extracts do not supply fuel to the body and are not to be regarded as energisers, while the prices at which they are sold are consequently altogether disproportionate to the benefits obtained.

"Meat Extracts," Dr. Lane Claypon has reported, "form an important part of the dietary in consequence of the presence of a variety of substances—present in meat in comparatively small quantities—described together as extractions. While much of the part that extractives play in metabolism is not understood, yet one thing is clear; they do not supply energy to the body.

"As meat extracts, the more extractive any sample contains the better it is. Added fibrine, gelatine, or meat fibre can be disregarded as being of but little importance, for the protein present in a cup of beef tea made from the pro-

prietary samples examined is small, and the cost of such protein, if taken from the point of view of its energy value, is exorbitant. One had better eat meat itself, or bread, or any other food-stuff.

"Suppose, for instance, one considers the amount of substances such as meat fibre, gelatine, and peptones which can be regarded as of real nutritional value, from the energy point of view, in an ordinary proprietary meat extract. If such an extract contains about 20 per cent of these substances, in a cup of beef tea containing about 5 grammes of the proprietary extract one might expect $\frac{5 \times 20}{100}$, or 1·0 gramme of protein and its allied substances. The amount of protein eaten in a day averages about 100-120 grammes, so that it is clear that the protein in a meat extract is negligible. Consider the absurdity of paying 3d. for a cup of fluid containing 1·0 gramme of protein! It is evident, therefore, that meat extracts are drunk for their extractives and not for added meat fibre, gelatine, etc."

Apart from the lack of food value, an analysis which Dr. Lane Claypon made of various meat extracts on the market showed that they differed enormously in their relative values even when

regarded merely as stimulants, and whereas one example was proved to contain extractives from 1860 grammes of beef in 100 grammes of the meat extract, the proportions in other cases were 1060, 940, 731, and 721 respectively. And although it is true that the preparations varied as to price, it cannot be said that the gain in cost was commensurate with the loss in the quantity of extractives present.

In respect of the methods of preparation, again, the samples displayed varying degrees of merit, and the extract which was a long way superior in extractive strength was slightly below the next one on the list as regards preparation. As a general conclusion, however, Dr. Lane Claypon states that, "from a physiological point of view proprietary meat extracts are not so good as a home-made beef tea". Lastly, I would remark that many problems, partly practical, partly scientific, arise in connection with this subject of food values upon which light has recently been shed by research workers although a great deal still remains to be done. I will refer to two. The first is with respect to the method of keeping bread.

"Rope in bread is caused by one or two organisms, viz. *B. Mesentericus Fuscus* or *B. Mesentericus Vulgartus*. One of these bacilli is supposed to

particularly favour the skins of potatoes, and the other skins of wheats, rye, caraway, and other seeds, but experiments have shown that you can meet with the organism almost anywhere where there is dirt or dust. A few years ago Mr. Bevan, public analyst for Middlesex, made analyses of the principal kinds of wheat on the market, and the bacillus was present in all. Generally speaking, the effect of the organism is not noticeable in food-stuffs, but, given proper conditions for development, good food is by this organism turned into a most obnoxious article. The characteristic effect on bread is an inclination for the centre of the loaf to go soft and darker than the surrounding substance, and the odour is most objectionable.

"Having shortly described the disease, it is well to look into the best means of combating; therefore the weak spots or media through which the bacilli get in the bread must be ascertained. But it must be premised that cleanliness is always the best antidote to disease; therefore white flour is least liable to show the disease, although it may be present, and wholemeal flour, because it is likely to contain the bacilli in the skin of the wheat, is more susceptible.

"From experiments made with wheat flour the following are the results:—

Admixture Approximately.	Condition after being Baked and Kept in Temperature of 90-95° F.			
	16 hours.	24 hours.	32 hours.	72 hours.
70 per cent extract from wheat.	Good	Good	Good	Fair
80 per cent extract from wheat.	A. Good	Slightly tainted	Tainted	Bad
Wholemeal.	B. Slightly tainted	Tainted	Bad	—
80 per cent extract from wheat plus 10 per cent extract from maize and 10 per cent extract from flaked maize.	D. Slightly tainted	Tainted	Bad	—
80 per cent extract from wheat plus 10 per cent extract from maize and 10 per cent extract from oats.	E. Slightly tainted	Tainted	Bad	—
80 per cent extract from wheat plus 10 per cent extract from maize and 10 per cent extract from barley.	F. Slightly tainted	Tainted	Bad	—
80 per cent extract from wheat plus 15 per cent extract from maize and 5 per cent extract from malted barley.	G. Slightly tainted	Tainted	Bad	—

The foregoing were severe tests, as the samples of bread were not cooled at all but kept in a moist heat—namely, covered with a damp flannel. Now when cooled first, as the duplicates of samples were, a different result was obtained. The loaves were cut at 32 and 72 hours respectively, and the test showed :—

After Cooking then 90-95° F.	32 hours.	72 hours.
A	Good	Good
B	Good	Good
C	Good	Tainted
D	Good	Slightly tainted
E	Slightly tainted	Bad
F	Slightly tainted	Tainted
G	Tainted	Bad

"These experiments and others made show that the method of keeping the bread moist, as is favoured by certain bakers, is wrong, and conducive to subvert the intention of the Food Controller.

"With no other antidotes to adopt, experiments have shown that to cool thoroughly the bread after thoroughly baking it is a good one. Acid substances, such as vinegar and acid phosphate of lime, delay the development of the spores. Indeed, some loaves of bread, made from a highly nitrogenous bread in which sultanas had been mixed, kept good for three weeks in a greenhouse in midsummer. Many similar loaves have been sent to prisoners of war in Germany, and have arrived sound."

The other problem is that of the relative values of British and imported meat. Experiments have been carried out under this heading by the Vickers catering department, and these caused the opinion to be formulated that, when the prices come within 15 per cent of one another, it is cheaper to buy British meat.

A general review of the subject discussed in this chapter will probably convince the unbiassed reader that, while the broad lines upon which a campaign to extend our knowledge of dietetics must be planned have now been irrevocably

settled, the time is distant when we can lay down the law as conquerors of a whole territory. People who imagine that the nutritive value of a whole ox can be condensed into a teacup are suffering from hallucinations; they will also recognise that the Teutonic belief in beer as fluid bread is a fond delusion. They will see that "calories"—which an eminent statesman decided to ignore—are both intelligible and important, but they will at the same time decline to admit that existing standards of calories or protein are the last words of dietetic wisdom.

CHAPTER VIII.

MOTOR TRANSIT.

Point to point locomotion—Chars-à-bancs and their value.—A tour of the hostels—Payment of fares by ticket—The cost per mile.

PARAMOUNT among the advantages of the motor vehicle is the fact that, in addition to its qualities of tirelessness and speed, it confers the ability to travel from point to point, quite irrespectively of rails, time-tables, or prescribed routes. Applied to the needs of munition workers it has been found invaluable in connection with the several Vickers establishments.

A fleet of twenty-eight Albion motor chars-à-bancs is maintained in constant service in the North Kent District. The vehicles are of 32 h.p. and of the 3-ton chassis type. Their normal seating capacity is thirty passengers, including the driver, but they usually carry as many as forty persons and sometimes even more. The char-à-banc bodies fitted are of the standard War Office type, with fixed canvas tops.

As the hostels are widely distributed over an

area quite unprovided with any means of public service transit, the chars-à-bancs fulfil the requirements of the case in a way that is signally effective. Every morning the motor vehicles make a complete round of the men's and women's hostels, and convey the occupants to the works, from which they then take back those who have been working on the night shift. In the evening the chars-à-bancs bring in the night-shift operatives, and take back the day workers to their respective quarters. They are also used in the dinner hour for the benefit of those who prefer to have their meals at home in preference to using the canteens, provided they live within a twelve minutes' journey from the works. In some cases the preference is exercised for the sake of enjoying the meal at home, and in others for the sake of the journey in the fresh air.

The drivers are nominally at work from 4.30 a.m. until 9.15 p.m. These hours seem long, of course, but the actual work is really normal. The drivers' wages are 50s. per week, plus 7s. war bonus.

All fares are paid by means of tickets sold in advance, specimens of which are reproduced herewith :—

Number 17251

This Ticket entitles holder to **6** double journeys.

Erith and Northumberland Heath.

Ticket must be renewed each week.

Available to.....
(inclusive)

Bearer's Works No..... **Price 1/3**

NOT TRANSFERABLE. TO BE SHOWN ON DEMAND.

Bell Punch Co., London.

This Ticket is not transferable and must be given up to driver when entering Bus.

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The drivers are not allowed to take, nor passengers to proffer, cash payments in any circumstances whatever, and are informed as to their liabilities under the Corrupt Practices Act as follows: "Passengers or drivers are hereby warned that offering or accepting money in lieu of tickets renders them both liable to prosecution". To check malpractices a road inspector is employed.

A graph is kept to show the comparative load

factors of each of three services. The cost of the fares is based upon an estimate of ¾d. per mile. The cost of operating, including overhead and management charges, is 16·45d. per mile. All the petrol used is subject to half duty. The consumption of petrol averages 6·12 miles to the gallon. In order to check both petrol and tyre consumption, the running of each char-à-banc is separately costed, and frequent tests are made in order to ascertain the consumption of spirit.

A special garage has been erected near the Crayford works for the housing, cleaning, and repair not only of the chars-à-bancs but also of the ambulances, two in number, used in connection with the works hospitals, and of six motor vans employed by the Catering Department. Petrol is stored in an underground tank, which is provided with the Bowser measuring pump system, considerable economies being thereby effected.

Adjoining the garage is a workshop in which the motor lorries belonging to the Kent works are repaired. Owing to the large number used a tyre press is installed, and an average of thirty-five wheels per week are re-tyred. It has been found a matter of prime importance not to run motor lorries with solid tyres in a badly worn

condition, as excessive vibration is otherwise set up, with serious effects upon the chassis. The cost of the tyres averages ·1187d. per tyre mile. Careful attention to repair work and the maintenance of the motor vehicles of every type is imperative ; e.g. one broken-down char-à-banc means from sixty to eighty men or women absent from work. It may be added, however, that the Albion vehicles have rendered good service and proved very satisfactory.

The Road Board has been most helpful throughout in making up the roads used by the chars-à-bancs, and every courtesy has been displayed by its officials. As illustrating the extent to which the fleet of chars-à-bancs has been used, I may mention that these vehicles have carried, during a period of nineteen months, no fewer than 1,179,327 passengers, and have covered a total distance of 427,213 miles.

These figures alone serve to show that a want has existed and been met, and wherever similar, or even approximately similar, circumstances exist the use of motor vehicles may be regarded as essential, in the interests of employers and employed alike.

CHAPTER IX.

HOSPITALS AND MEDICAL SERVICES.

Accidents inevitable in munition factories—Surgeries and dressing stations—A medical referee's experiences—The works ambulance corps—Rest rooms—Dope poisoning—Body vermin—Eye cases—Skin eruptions—T.N.T. workers—Venereal disease—Unfitness.

MINOR accidents involving surgical attention are apparently inevitable in large munition works, and these should certainly be provided with surgeries and dressing stations. If the influx of labour, moreover, is in excess of pre-war conditions it may be taken for granted that the hospital accommodation of the district is inadequate, and must be supplemented in the works themselves, in order to cope with the more serious forms of accidents and sickness, and also infectious cases.

The North Kent district was so ill-provided with hospitals that those *in situ* could have been kept filled twice over by cases from the Vickers works alone. There were, in fact, only 54 beds available, while the population of the

district was 107,163 persons, and is estimated to have recently increased by at least 20,000.

In the first instance the Guardians' Infirmary at "D. 1" hostel, Dartford, was taken over, and this is now provided with 50 beds and an operating theatre. The services were engaged of an experienced surgeon, together with two doctors, and also a matron and staff of nurses. Surgeries and dressing stations were established in the works themselves, in charge of competent first-aid male and female dressers. An isolation hospital for infectious diseases was also established at Dartford with 24 beds.

Two Wolseley motor ambulances were provided for transport purposes between outlying works and the "D. 1" hospital at Dartford, while hand ambulances are employed when necessary for local use.

Reports are sent in monthly to the manager by the medical referee, showing the number and character of the cases dealt with at the works surgeries and dressing stations. The totals dealt with are very large; *e.g.*, the appended table gives the figures relating to the Erith and Crayford works respectively during the year 1916:—

	Erith.		Crayford.		Total.
	Male.	Female.	Male.	Female.	
1. Total accidents .	12,844	9,846	9,389	2,972	35,051
2. Accidents dressed at surgery . . .	11,167	8,892	9,371	2,972	32,402
3. Accidents sent to Vickers hospital .	220	36	99	10	365
4. Redressings at surgery . . .	11,715	12,369	10,877	4,423	39,384
5. Eye cases . . .	2,572	991	1,033	98	4,694

A monthly report is also furnished as regards the "D. 1" hospital, where the following cases were dealt with during 1916: Admissions, 733; Out-patients, 1003; Operations, 341; and Dental Cases, 451.

The reports are made according to the table on the opposite page.

An anti-venereal disease propaganda was established, and a number of meetings were held which were well attended. At the "D. 1" hospital a clinic was established with all the necessary facilities, under agreement with, and with financial assistance from a public authority. Important results are expected from this clinic, which is one of a kind which should be established in all industrial centres.

It may be added that no charge whatever is made to the work-people for hospital treat-

ment or surgery work, the cost being borne entirely by the company.

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REPORT OF ACCIDENTS AND SICK ABSENTEES AMONGST THE EMPLOYEES AT THE WORKS.

	1	2	3	4	5	6	7	8	9	10, etc.	Total.
Number of employees { M. / F.											
Total accidents { M. / F.											
Accidents dressed at the sub-stations { M. / F.											
Accidents sent to Vickers hospital { M. / F.											
Accidents dressed at surgery { M. / F.											
Absentees from accidents { M. / F.											
Absentees from sickness { M. / F.											
Redressings at surgery { M. / F.											
Redressings at sub-stations { M. / F.											
Eye cases { M. / F.											
Hostel workers											
1. Total absent from sickness { M. / F.											
2. Sent to Vickers Hospital { M. / F.											

Signed.....
Medical Referee.

As will readily have been realised from the figures as to the number of accident cases within

one year, the whole question of first-aid treatment is of no small importance, and I have therefore asked the medical referee, Dr. M. W. Renton, to furnish a series of practical hints as to the conduct of a first-aid service in munition factories, and his interesting and valuable notes are subjoined herewith :—

I. FIRST AID IN FACTORIES.

A first-aid service, to be of value, must have an organisation proportionate to the number of work-people employed. There should be—

(*a*) **A (Primary) Central Surgery** where the employees exceed 299, with a trained attendant in charge if there are more than 500 employees—preferably a trained nurse if a large proportion are females or young persons.

(*b*) **First-aid Dressing Stations** (secondary) in addition to (*a*) for every fifty persons employed in large factories. These stations are for very minor accidents and redressings. Employees will not visit the central surgery with very trivial injuries from remote parts of a large factory because of fuss and loss of time. Each dressing station should be in charge of a foreman or forewoman, preferably trained. In small factories (twenty employees) a dressing

station, properly conducted, will suffice; *e.g.*, at the Vickers works at Crayford dressing stations are established in addition to a central surgery, and are under the care of members of the works ambulance corps.

A dressing-case with sloping top is kept on a shelf, with an attached receptacle for soiled dressings and a tray for soiled instruments, which are removed by the trained attendant at the centre surgery, who is also responsible for the fittings and dressings. The instructions are printed on the lid (see p. 124).

(*c*) A works ambulance corps, with certificated members (St. John Ambulance Association), in charge of the trained attendant at the central surgery, to carry out the duties of first aid. Members should be badged in order to enable them to exercise authority. In addition to their ordinary training, they receive special lectures by the works surgeon on first aid in factory life, with special reference to injuries produced in their own particular factory or shop, and specialising in preventive measures. At munition works the chief types of injury are those due to :—

1. Machinery accidents.
2. Explosives and burns.
3. Chemical injuries (powder, fluids, or fumes).
4. Eye injuries.

	Large *Burn*. Sterile Dressings.	Large and Small *Wound*. Sterile Dressings.	Small *Burn*. Sterile Dressings.
	Directions.		*Tourniquet.*
1. *Forceps*, to remove and hold dressings (and to catch artery in grave emergency only by surgeon)	1. This *First-aid* Emergency Cabinet is to be used only in *very slight injuries*, and only in parts of the factory very remote from the works surgery.		To apply above a profusely bleeding wound.
2. *Scissors*, to open packets, etc.	2. All *severe wounds*, i.e. bleeding, gaping, with loss of tissue, or deep, severe, and painful burns to go to the works surgery.		The pad to be placed over the nearest arterial point above the wound.
3. *Metal Holder*, containing sterile eye brushes (covered with wool).	3. The *dressing packets* to be removed and held only by the forceps (1), cut open with scissors (2). *N.B.*—Fingers must not be used to pick out packets.		
4. *Bottle of Eye Application* (cocaine, castor oil, 5 per cent, perchloride, 1-3000).	4. *Wounds* must not be washed nor touched with anything. Simply paint with iodine solution (5), then either collodion (6) or a large or small dressing.		
5. *Bottle of Iodine Solution*, 2 per cent to paint wounds.	5. *Burns and scalds*, apply a large or small burn dressing at once.		
6. *Bottle of Collodion*, to apply over very slight wounds which neither bleed nor gape.	6. *Eye injuries.* No particle must be picked out of the eye with any sharp instrument. It is only allowable to brush the particle out with one of the sterile brushes (3) on which drop a few drops of eye solution (4); if still painful or a particle remains, go to the works surgery.		
	7. *Redressings* allowed only of very slight injuries where no pain, swelling, discharge, or redness.		
	8. All cases dealt with here must be entered in the register attached.		

The works ambulance corps, both male and female, practises a special stretcher drill, particularly in the handling of stretchers in difficult positions, such as on staircases. The ambulance corps stationed in the danger area at the Dartford (cartridge) factory has had special instruction in dealing with burns, and particularly as to the prevention of the spread of burns from clothing. Wet blankets are provided at certain points, and special fire extinguishers to play on the person's clothes. The ingredients of the spray are harmless to the individual.

Instructions are given to the workers against the wearing of celluloid ornaments for the hair, or flannelette clothing and underclothing. The overalls used are partly fireproof.

The immediate application of dry picric acid gauze has been found to give prompt relief, and the best after results, in all cases of burns, followed in twenty-four hours by dressing soaked in white petroleum oil (refined).

It is very difficult to impress thousands of employees with the need for care of themselves by printed instructions, and it is only possible to obtain thoroughness in first-aid methods by *training as large a number as possible* of the workers, *explaining the risks, methods of prevention*, and first-aid procedure.

Employers may establish the most perfect first aid and health measures, but these will fail without the co-operation of the workers. It must be impressed upon them that the smaller the wound the more likely it is to retain infective material introduced (*e.g.*, a prick), and so cause "blood poisoning," more so than large open wounds, from which blood is flowing and thus frequently carries impurities away.

The smallest prick ought to be treated at once and then protected from impurities being introduced from the adjoining skin, clothing, tools, soil, dirt, etc. Microbes which are the cause of wound infection, and so of general blood poisoning, whitlows, abscesses, inflamed glands, etc., swarm on the skin, clothing, soil and working material (*not* on the bright working parts of machinery where mineral oil is used as a lubricant, or other oils which are properly treated with antiseptic additions or sterilised periodically by heat). It is not the rust nor verdigris on metal parts which causes poisoning of wounds, but the microbes that are there also (a boiled rusty nail or a boiled verdigris copper wire will not infect a wound).

Although these microbes are sometimes carried into the flesh at the time of the accident, they are much more frequently conveyed into a

perfectly clean wound by contact with clothing, skin, overalls, aprons, handkerchief, improper washing of the parts, or carrying dirt into the wound from adjoining dirty parts.

The wound, therefore, ought not to be handled at all, nor washed, nor covered temporarily even by an overall, handkerchief, etc.

Profuse hæmorrhage is arrested in the proper manner, but slight hæmorrhage ought not to be staunched, as a little oozing does good. The wound and a little area round it ought to be painted with iodine solution (2 per cent), and at once covered with a purified dressing; if a mere prick, a small collodion dressing will suffice. Dressings for hand injuries especially must be neat, and free from threads and ends; otherwise they impede work and will be discarded. Special tape sterile dressings, neat stitching on of the dressings, or adhesive plaster over lint or gauze, not next the skin, are better than the ordinary loosely woven bandages.

Where the wound, as in the vast majority of factory injuries, does not prevent continuance of work, redressing at the central surgery (*a*) or at the dressing station (*b*) ought to be encouraged till all risk of infection has disappeared, and the wound has healed. If any inflammatory condition appears, it ought to be attended at the

central surgery, where it may be benefited by fomentations. With this system of first aid in the Dartford, Crayford, and Erith factories during the last two years, poisoned wounds have become practically a thing of the past, and with the experience I have of other workers in factories in this area without any such first aid organisation, I can testify to the effort being fully recompensed by increased efficiency and diminished absence from employment.

The factor of personal infectivity has to be borne in mind, from skin diseases, foul mouths, defective teeth, etc., and this, although outside the province of treatment by the works surgeon, ought to be noted by him, and pointed out to the worker.

II. REST ROOM IN FACTORIES.

The prime service of a rest room is to give consideration to female workers at the functional period, which temporarily incapacitates some workers so much more severely than others. It ought to be a quiet, cool room, with lounge chairs and couches, adjoining the primary first-aid station for the female workers, with a qualified nurse in charge, and can be used by the matrons and her clerical staff as an office, thus ensuring adequate supervision.

THE OPERATING THEATRE AT "D. 1" HOSTEL, DARTFORD

THE SURGERY AT CRAYFORD

Apart from the rest room, routine rest intervals of 15 minutes for female workers in relays between 8.30-11.30 a.m., with 7 minutes between 2-5 p.m., are established at the Crayford works. These are apart from the meal hours, and are for rest, fresh air, tea, or a light meal.

Cases of sudden illness are dealt with in the rest room, and the works surgeon may investigate such, or cases of frequent illness in an individual worker, to see whether the illness may have any relation to the nature of the employment and to advise accordingly—cessation from night work, overtime, or work in the factory altogether, or change of employment, with all the facts of the case in hand.

With proper supervision the rest room privilege is and never can be abused, misunderstandings with foremen are prevented, and efficiency of work is increased.

III. DOPE POISONING.

Although the manufacture of dope containing tetra-chlorethane has ceased, and only dope approved by the War Office can be used, there is still need of continual precautions in the dope varnishing shops, where the volatile constituents of dope—benzine, acetone, methylated

spirit and amyl-acetate—give off fumes which cause headache, giddiness, nausea, throat and eye irritation, and fainting.

The preventative measures consist of :—

1. Special exhaust ventilation (air to be changed thirty times per hour), fresh air entering above, and the contaminated air extracted by powerful fans through floor outlets. The new dope rooms at Crayford are perfect in this respect, and an additional room is provided as a drying room. The room temperature is kept at 72° Fahr. This temperature is essential for manufacturing purposes, and is 7° Fahr. over the 65° Fahr. asked by the Home Office from a health stand-point ; but, to balance this, the air is changed forty times per hour, ten changes more than the Home Office lays down.

2. Periodic examinations of the girls monthly by the factory surgeon (Home Office) and fortnightly by the works surgeon. No girl under 18 years, or with constitutional or organic defect, is employed.

3. No girls are allowed to have meals in the work-room, and each girl is given a glass of milk in the morning and has alternate work—2 hours in the dope room and 2 hours in another room at needlework (usually).

IV. BODY VERMIN IN FACTORY WORKERS.

This refers specially to live *pediculi* (lice) and nits in the hair, and is a most serious matter where female workers are exposed to the conveyance of vermin from overalls and caps in cloak-rooms, and also in the use of lavatories.

Workers with obviously verminous heads ought to be kept away from the factory until the rest room nurse is satisfied that no vermin is left.

Remedies.

(*a*) Oil of sassafras (quite inoffensive) rubbed well into the head over night, the hair being tied in a towel.

(*b*) Wash well in the morning with soft soap and water.

(*c*) Then use a tooth-comb dipped in :—

(1) Methylated spirit, and acid carbolic, 1-20 (equal parts).

(2) Any disinfectant—Jeyes, Cyllin, etc.

When the head is so freed of live *pediculi*, nits can then be got rid of only by frequent brushing, the brush being dipped in vinegar.

Another Remedy is paraffin. This is good as a wash, but must be used with great care, because of danger from naked lights.

V. EYE CASES.

The removal of foreign bodies from the eyes, other than by merely brushing out a substance lying on the surface by an unskilled person, is discouraged in every way. Many eyes are irretrievably damaged, or even lost, through the introduction of impurity from a pointed match, or impure instrument, in the hands of an unskilled person.

Bottles containing cocaine in antiseptic oil, with a *clean brush for each case* (very necessary because of transference of disease) are provided at the dressing station to wipe out foreign particles, the used brush to be set aside on a tray for sterilisation later.

The removal of deeper substances may be effected, with all due aseptic precautions, by the trained attendant, but if at all difficult the works surgeon only deals with it.

VI. ERUPTIONS AND INFLAMMATION OF THE SKIN (Dermatitis).

These, accompanied by pain, swelling, and irritation, are caused by industrial conditions, novices handling substances ignorantly or carelessly, or workers careless or neglectful in washing their hands, clothing, etc. Persons with skins already tainted with blotches, spots,

acne, or large-pored skins are more liable to such dermatitis.

All skin complaints, in shops where substances are handled which are known to irritate the skin, ought to be at once investigated. Treatment ought to be given to check the complaint, and, if necessary, the worker ought to be taken off the work until well. If, on return to work, there is a relapse, and it appears an incorrigible case, the worker ought not to continue the work.

The general preventative measures which are carried out at these works are :—

(*a*) Abundance of washing conveniences, with a supply of neutral soap.

(*b*) Protective overalls, well kept, with, in certain jobs, special cuffs, rubber gloves, veils ("Compo").

(*c*) Disinfectants ; solvents for washing off chemicals—e.g. hyposulphate of soda (a weak solution gets "Compo" staining off) ; bland lubricants rubbed on the clean hands before beginning work—e.g. lanoline, 1 part, castor oil, 2 parts.

(*d*) Treating of cutting liquid compounds with disinfectants, and preventing their contamination in every possible way.

(*e*) Sterilisation of lubricants by heat period-

ically, specially necessary in the case of animal and fish oil, less so in vegetable oils and hardly at all in mineral oils, which are in themselves antiseptic.

(*f*) The general hygienic care of the shops, floor cleaning, and disinfecting is an important factor in preventing contamination of lubricants and cutting compounds.

Staining of the skin yellow by picric acid, lyddite, tetral, or amatol is not accompanied by any harmful symptom, and is to be distinguished from jaundice, as in cases of T.N.T. poisoning, in which there is yellowing of the whites of the eyes.

VII. T.N.T. WORKERS.

(*a*) No worker under 18 or over 45 is engaged on T.N.T. work.

(*b*) All are examined before beginning the work, and all such workers must be organically and constitutionally fit.

(*c*) No worker is engaged with defective teeth. A factory dentist attends such cases at the Vickers Hospital.

(*d*) Milk is given every morning.

(*e*) Fortnightly examination by the works surgeon.

(*f*) On and off T.N.T. work every fortnight.

(*g*) With the least symptom of illness, T.N.T. workers report to the nurse at the surgery, who reports if necessary to the works surgeon.

There has been no illness due to handling T.N.T. in the Dartford factory.

VIII. VENEREAL DISEASE.

The question of dealing with venereal diseases in a factory has presented itself, and cannot be set aside, because of the common use of lavatories, and the refusal of fellow-workers to work alongside those whom they know or suspect of so suffering. Such cases have been investigated, verified, or exonerated, and directed to have proper treatment if affected.

IX. UNFITNESS.

The question of unfitness for work is dealt with most satisfactorily in a routine manner at the central surgery. The employee puts his or her case to the foreman or forewoman, and through the management the works surgeon is instructed to examine and report on the case. All possible facts are collected, bearing on the nature of the work, by the works surgeon, and after examination of the worker a plain statement of the case is presented.

In this connection, the causation of hernia

requires careful consideration to decide whether the hernia is congenital, wholly or in part, or whether it is due to the prolonged strain of years, or to a recent severe strain. It is imperative, in order to form a correct opinion, to have all cases of suggested hernia, due to work, examined by the works surgeon as soon as possible after an alleged accident.

The existence of old hernia, varicose veins, and former injuries ought to be recorded wherever the opportunity arises as a routine procedure.

One has only to think of the dangerous occupations to decide definitely that there is an inseparable relationship, in varying degrees, between all work and health and disease, and it is only by intimate knowledge of both that a correct conclusion can be reached, especially if, added to this, one has a knowledge of the home conditions and habits of the worker.

M. W. Renton, M.D.,
Medical Referee, Vickers Limited.

CHAPTER X.

AMUSEMENTS.

The Crayford theatre — The value of amusements — A theatrical manager's experiences—A note on the Summer Time Act.

For the benefit of their munition workers Vickers Limited built at Crayford, in 1916, a theatre of their own—the Princesses—and it was formally inaugurated on July 26th of that year by H.R.H. Princess Christian. The venture proved an enormous success, and was very greatly appreciated by the workers, but unfortunately the building was burned down in the following December, and the entertainments have since been carried on, by permission of the Y.M.C.A., in the Rodney Hut annexe.

During its brief period of existence, however, the Princesses Theatre produced 138 performances, with 32 distinct programmes, among which were the following :—

The Grand Opening Concert
"The Silver King".....*Drama*
"Miss Hook of Holland"
Musical Comedy
"Diana of Dobsons"...*Comedy*
"Caste" .....*Comedy*
"The Rotters" .....*Comedy*
"Our Flat".....*Farce*
"Jane".....*Farce*
"The Second Mrs. Tanqueray"
"Mr. Wu." .....*Drama*
"High Spirits" .....*Farce*
"The Girl in the Taxi"
Musical Comedy
"The Brownies" .....*Entertainers*
The Band of H.M. Coldstream Guards
Sapellnikoff.....*The Russian Pianist*
Fifteen Picture Programmes.

Bookings had already been secured, moreover, for "The Mikado," "Peg o' my Heart," "The Case of Lady Camber," "A Message from Mars," and other well-known plays, as well as for a pantomime and a concert by Marie Hall and party.

At Dartford, also, "al fresco" entertainments have been provided weekly in the Avenue, Darenth Road, or under cover, in wet weather, in the "D. 5" canteen. These and the Crayford entertainments alike have been carried out under the direction of Mr. Frederic Dale, who has furnished the following notes as the outcome of his experiences :—

"In ordinary times 'when the work is done' would be a fitting title for any say about munitioneers' amusements; but work just now is never done.

"'All work and no play' was never popular. 'All work and good pay' is an accepted war-time condition that has made the provision of

'play' for the war-worker an imperative, though difficult, problem to tackle.

"The old work day, finishing at five or six o'clock, allowed a fair time for evening amusement. The new work day allows only something in the matter of minutes for a wash and brush up, a bite, and then bed, leaving the evening paper for a read during next morning's breakfast.

"It was to meet these conditions that the Princesses Theatre was erected, almost adjoining the works at Crayford, and during its short and merry career, from July 26th to December 2nd, there was never any doubt as to its popularity. The entertainments provided ranged from the popular cinema show to the classical pianoforte recital (e.g. Sapellnikoff, Nov. 1st), *viâ* first-class London companies in drama, comedy, vaudeville, musical comedy and a visit from the band of H.M. Coldstream Guards.

"The munition workers in a village or small town find no great joy in, or even need for, a 'village entertainment'. They want the very best, for they hail from the big towns, where they have had the choice of good entertainments. Their spare time is little, and that little cannot be afforded for a feeble entertainment, but would rather be spent on the allotment or in painting the house.

"And, above all things, the desire to 'leave the works out of it' is positive. Out of Blob's pickle factory into Blob's recreation hall is 'not good enough'; it is too much like 'work with the chill off'. The most successful feature of the Princesses Theatre, Crayford, was that it quickly became the district theatre. The audiences were augmented by visitors from the neighbouring towns; and, as the worker had no time to go to the next town to get amongst a change of people, the next town folk came to the munition works theatre and deemed it some sort of a favour to be able to do so.

"The popular show was the one offering good comedy. The workers were ever ready for a good laugh at real fun and sound in their judgment of wit, with a decided leaning toward pleasant, bright humour. A four-reel drama, with a couple of murders in each reel, and shipwreck, fire, and earthquake to finish with, is a certain laughter-maker with these audiences. A good scenic picture, with a moderately possible story, will receive a flattering attention always; in short, the worker's desire seems to be for entertainment rather than excitement.

"At Dartford a weekly entertainment has been given 'al fresco' and with much success. A distinct feature of the programmes has been the

visits of the various bands from the other Vickers works. The Erith, Dartford, Crayford, and Weybridge bands have each provided musical selections. In addition to the band the programme has usually included an entertainer and vocalist. As a special event the band of H.M. Scots Guards filled the bill.

"Apart from the hearty crowds that attend the many entertainments provided, it is felt that the general gaiety of the entertainment announcements, and the 'talk' of those who 'have been,' constitutes a wholesome and cheery topic with those who cannot get to the shows."

Under the heading of "Amusements" may also be included various phases of welfare and social intercourse. In order to make these successful it is of the utmost necessity that the employees themselves should to a large extent provide their own finance, which may be supplemented at the discretion of the employer, who, of course, should give every facility for the employees to enjoy the full measure of their enterprise in these directions.

Boxing, for example, has always been very popular amongst Englishmen, and as a rule a large section of the employees would be found to take an interest in it.

Outdoor entertainments consist mainly of football and cricket clubs, which hold matches with other works in the district; and, as an entrance fee is usually charged, these clubs can be to a large extent self-supporting.

In some works angling societies have been extremely popular, and in one works alone the prize money has amounted to £48.

Indoor games, such as chess, draughts, and bowling, also find considerable favour.

In addition to the foregoing, horticultural sections have been formed in connection with allotments and small gardens attached to the workmen's houses, and lectures have been given to enable the employees to obtain the best results from the ground at their disposal, and prizes are offered annually.

Amongst other minor organisations may be mentioned a male voice choir, many bands and orchestras, concerts, whist drives, harriers and beagles.

One of the most important clubs that can be organised in any works is that of rifle shooting, and it should be easy to establish a miniature rifle range, together with the necessary rifles and ammunition, and provide regular competitions with small prizes.

In every works during the war, Soldiers'

Christmas Gift Funds have been in operation, and large sums of money have been collected by the workers for the provision of gifts sent out to their co-workers now serving in the various theatres of war.

It would appear unnecessary to do more than mention in this book the advantages of a Works Sick Benefit Club, as it must be assumed that this is in operation in every factory in the kingdom.

Before leaving the subject of amusements, I may testify to the signal benefits which have accrued from the passing of the Summer Time Act, 1916, which has made a vast difference to the amount of time available to the workers for relaxation purposes. In this connection I may mention that when the Act came up for consideration, in November, 1916, by the Summer Time Committee, I had the honour of appearing as a witness, and, *inter alia*, presented the following as evidence in favour of the renewal of the Act for the following year:—

"The Act does not appear to have affected our factories in any special way, other than beneficially. No difficulties of any kind have been experienced. The minor adjustments in regard to the change over of day and night shifts have been made smoothly and without friction with the men, and from inquiries I have made at our

works no comment whatever was made by the men in respect to the question of 'pay'.

"Undoubtedly the employees have taken advantage of the extra hour of daylight for outdoor recreation whenever the weather permitted. This has been frequently noticed and commented upon. The boon to office workers in this respect is inestimable.

"A distinct improvement in health has been observed all round, but especially amongst the staff engaged in sedentary occupations.

"*Note* 1.—In view of the universal reduction in street lighting throughout the industrial towns, the extra hour of daylight reduces the risk of street accidents to workers proceeding from their business to the neighbourhood of their homes during the months of April (if adopted) May, August, and September.

"*Note* 2.—The same remarks apply to the motor transit used largely in connection with many of our works for conveying work-people to and from the works.

"As the result of personal observation and investigation I have no hesitation in saying that the Summer Time Act should become a permanent institution. I consider it one of the greatest boons conferred on the industrial classes employed in the greater towns and cities by recent legislation."

THE WOMEN'S SURGERY, ERITH

A TYPICAL RECREATION ROOM AT A VICKERS HOSTEL

CHAPTER XI.

WORKS POLICE.

Espionage a danger to be combated—Sabotage—Thefts and breaches of works regulations—Equipment and pay—Heavy annual cost—Air raids.

A DEPARTMENT which calls for a few annotations by the way is that of the works police. In war time the provision of a staff of this description is especially necessary for the purpose of properly safeguarding the works from inside and preventing the admittance of unauthorised or malicious persons. With such a vast production of war material, of many and highly important kinds, as characterises the Vickers factories, espionage is at all times a danger to be combated. Added to this is the possibility of sabotage, which may be effected by enemy agents or by international political societies, so called.

Even in peace time, however, a force of works police is desirable in the case of big undertakings, for the prevention and detection of thefts and breaches of the works regulations

generally; e.g. idling, smoking, irregular clocking and clocking frauds.

All the Vickers police are in uniform. They have not been enrolled as special constables, as no advantage would have been gained thereby, nor would that course have been advisable in view of the Home Office regulations. The force at each factory is under the charge of a superintendent, who is usually a pensioned ex-chief inspector or superintendent of the regular police. Under him are sergeants, who are also, as a rule, pensioned police officers.

Superintendents are paid about £300 per annum; the sergeants receive £3 10s. per week, rising to £4 after six months' service, while the pay of the men is £2 10s. per week, rising to £3 after six months' service. All receive a free uniform and one week's holiday on full pay. The cost to the company is considerable, and averages, in fact, £7000 per annum for each factory, but it is considered to be absolutely necessary, and may even be regarded as a species of a insurance. As the provision of an efficient works police force is obviously, however, in the national interest the cost should, in my opinion, be borne by the Government.

During air raids the works police are very useful, particularly in the way of getting people

under cover during night alarms. They have also nipped in the bud many fires that would otherwise have had disastrous consequences. They work in two shifts, of twelve hours each, and get one day in fourteen off. Nearly the whole force is composed of ex-policemen, who know their duties and are well-disciplined and smart.

The works police co-operate with the regular police of the district, and look after the registration of aliens and see that their papers are in order. In explosive-filling factories they are very useful in detecting offences against the rules relating to "clean areas," and in preventing the secreting of matches and tobacco on the person.

Reports, it may be added, are sent in periodically from the police in all the works owned by the company throughout the country, and are analysed centrally.

CHAPTER XII.

THE WOMAN'S POINT OF VIEW.

The question of cost—Sympathetic consideration appreciated by female operatives—The check system for cloak-rooms—Cleanliness in lavatories—Dining-rooms may be too large—A qualified nurse required for rest-rooms—Malingering—Overalls—Social conditions and recreation.

INCIDENTALLY, of course, there have been frequent references to women workers in the preceding chapters, wherever it has appeared necessary from any cause to differentiate between the sexes. Lest the masculine point of view, however, should have led me to ignore any considerations of special importance to women, of whom Vickers employ some thirty thousand, I have invited Miss Pullinger, the Women's Welfare Supervisor at the Barrow works, to favour me with the conclusions she has arrived at as the result of her experience in a large centre, and her contribution is subjoined herewith :—

The question of "Accommodation and the needs of Operatives" is one of very great importance, being in close relationship to efficiency in production.

It is first necessary when approaching this question, to determine the arrangements which from a practical standpoint will give the best results both from the employer's and worker's point of view. As the conditions obtained in different factories vary considerably in character, it is advisable to make arrangements to suit each individual case, particularly in view of the fact that the larger firms are in a position to provide more elaborate accommodation than firms or concerns of smaller dimensions. It has been proved, however, that the question of cost does not materially affect the efficiency of the accommodation which it is possible to provide, if the organisation is carefully arranged and sympathetically carried out by all concerned. It has been the writer's experience that sympathetic consideration of the comforts of the workers by those entrusted therewith, is highly appreciated by the female operatives.

Although, as mentioned above, conditions in different factories vary to some extent, there are certain essentials which are common to all establishments, viz. the provision of cloak-rooms, lavatories, dining-rooms, rest-rooms, overalls, for the female operatives and adequate means for recreation when off duty.

A brief outline under these various heads will no doubt prove interesting reading :—

Cloak-rooms.—In arranging a cloak-room it must first of all be determined whether one, two, or three shifts are to be worked, and also that the means of access to cloak-rooms is such as will prevent congestion. In practice, the most efficient method of working a cloak-room is to use the check system, the principle of this arrangement being that each girl, on bringing her clothes to a counter running the length of the room, receives a check for them. Her clothes are hung on a peg bearing a corresponding number to that on the check, and on her presenting the check when leaving work she receives her clothes back again. With a little practice this system is very effective.

If this method is not adopted for some reason which the writer cannot see, the next best (but obviously more costly) arrangement is for each shift to have its own separate cloak-room, otherwise opportunities will exist for petty-pilfering by those so inclined. In order to explain this point clearly, it should be mentioned that the shifts are invariably arranged so that the signal for one shift to cease work is also the signal for another to commence thus securing continuity of production, one operative

relieving another at the machine or work, when the signal is given. The incoming worker therefore deposits her clothes in the cloak-room and proceeds to the shop floor, and the out-going worker, providing she is so inclined, may take clothes other than her own from the cloak-room. No matter what supervision is provided it is almost impossible to prevent such occurrences. An important point which must not be overlooked in a cloak-room, is to provide an entrance and an exit at opposite ends of the room, with easy access to the shop on the one hand and to the road on the other.

Lavatories.—In dealing with the question of lavatories, the all-important consideration of cleanliness must be observed. Great care is needed in the selection of a suitable attendant who will keep the place clean. In connection with this it should be remembered that plaster and wood are not recommended, but a tiled or concrete floor, with either tiled, glazed earthenware slabs being much cheaper and possessing all the advantages of tiles, inasmuch as they can be easily cleaned. Although the checking is not approved of by some people, the system of checking in and out of every girl is without doubt the best system to adopt; each girl handing her check to the clerk on entering, the check

being handed back to her on leaving and the time spent entered in a book. It will seldom, if ever, be found necessary to do more than record the time as the fact that the time is recorded is quite sufficient to prevent idling. It should, however, be said in favour of the girls that the majority do not wish to waste their time, but they may frequently be unable to gain access to the lavatories, owing to the idling of others.

Dining-rooms.—When building a dining-room, it should be remembered that the nearer it is to the workshop the better, the best means of access being from the shop direct without going out of doors. Large dining-rooms are not considered advisable. It is far better for each department or section to have its own dining-room, as it is more homely and quieter for the girls who are much easier to handle in smaller numbers, 300 to 600 being considered sufficient for one dining-room. The aim of every one should be to try and make the dining-room as pleasant as possible and this does not necessarily entail a large expenditure. Care should be taken to make the interior of the place pleasing to the eye, to provide good ventilation, plenty of light, and to maintain cleanliness; also efficient heating arrangements for the winter should be provided. The remainder is a matter of personal taste.

Rest-rooms.—Rest-rooms if properly managed are a great asset, but much depends on the person in charge, who should be a fully qualified nurse, tactful and possessing more than a superficial knowledge of human nature. A rest-room attached to each workshop or department is preferable to one central place, as when accidents occur the quickest possible attention is required. Girls will also go more readily to the rest-room if it is close at hand, and this, in the result, tends to prevent septic wounds developing. The nurse should be responsible for seeing that malingering does not occur, especially on the night shift, but at the same time every care should be exercised to ensure that no one is sent away until she is quite fit to resume work. A book should be kept giving a record of each case, its origin, date, and time, how treated, etc., and an analysis taken, say monthly, separating medical from surgical cases. If a chart is kept of the percentage of each, some very useful and interesting information can be secured.

Overalls.—The usual practice is for a girl on starting work to receive two sets of overalls. It is advisable that each girl should sign a receipt for these, showing the actual cost, which may be deducted in instalments from her wages. This amount should be refunded to her on her

returning the overalls when she leaves. Some firms make a practice of deducting 2d. per week from wages for renewals, and, where a laundry is provided in conjunction with the works, 4d. or 6d. per week is also charged for washing. The routine adopted in this case is that each girl, on handing her dirty overall into the shop stores on a certain day in the week, receives a clean one in its place. The advantages derived from this practice are obvious, especially to workers who are in lodgings where no washing facilities exist, and also where laundries cannot be depended upon owing to the shortage of labour.

Social Conditions, Recreation, etc.—As every one is aware, the social conditions in factories vary considerably, but there is perhaps nothing that will do more to improve the morals and add to the contentment of the workers than the provision of healthy recreation. The average girl in lodgings is at a loss to know how to spend her spare time, and if she is not guided into the right channels is apt to drift into loose company—in the majority of cases with no desire to do so, but simply because she is bored, or lonely, and perhaps for the first time in her life is away from home. She is also away from the restraining influences of her earlier life, and has

not learned how and where to draw the line in her newly found independence.

Besides the sports club, which should include hockey, tennis, football, swimming, rambling, and gymnasium, it is well to institute a sewing class, with music and refreshments. These classes, if properly organised, are invariably a great success. Saving clubs, mutual aid funds, and relief funds should all be encouraged, as a great many girls, although filled with every desire to do what is right, and to save money for a rainy day, seldom put these good resolutions into effect unless there is some one to help and encourage them.

In conclusion, it may be said that our munition girls are a good-hearted, cheerful crowd, anxious to do what is right, but they need some one to guide them. They are a big family and require to be treated as such. Most of them have left their homes, and miss the home care and comforts. To supply this want should be the aim of all who are entrusted with the moral and physical welfare of our girl workers.

CHAPTER XIII.

INDUSTRIAL UNREST.

A perplexing problem—The status of the employer—A common cause—Excess of government control—The old trades unionism—The Rank and File movement—Frank incentives to criminal actions—Mistakes of the past—Co-operation and co-ordination needed to avert industrial war.

POLEMICS, as such, are alien to the scope of this volume. It is impossible, none the less, when studying the welfare of munition or other workers in all its aspects, to avoid a recognition of the fact that it is very closely connected with a phase which is a dominant feature of the present time, and is generally referred to as "industrial unrest". As one who has been concerned with the finding of labour on an extensive scale during the war period, I feel impelled to devote this final chapter to a brief consideration of the most complex and perplexing problem that will confront the nation after the war.

I do not propose to discuss the almost endless details that together constitute the basis of industrial unrest. The Industrial Unrest Commission have reported fully and with astounding

unanimity on the causes which were presented to them through the evidence of those witnesses who appeared before them, even if certain evidence was ignored as to the underlying organisms at work. The point to which I wish to address myself specifically is the relationship of the employer to the employed.

While we cannot afford to ignore the serious propaganda which is being carried on to establish a "class war" of the first magnitude, we may feel assured that the majority of sober-minded citizens in this country will realise the necessity of recognising the status of the employer.

It must be admitted that, during the stress and storm of the past three years, the social views of the employed classes have advanced in ever-increasing progression, and have been urged on by the professional agitator, peace-crank, and declared rebel, who have fastened on to every grievance, however small in itself, to foster the ever-growing spirit of unrest engendered by war conditions and stress.

The employing classes have not been idle on this question, and during the same period have given ever-increasing thought to this vital problem. They, too, have broadened and developed their views, and I am convinced that the common cause that has seemingly widened the gulf

between "Capital and Labour" will ultimately knit them closer together.

It is exceedingly unfortunate that war conditions should have necessitated such close control by Government departments, who have wallowed in the morass of labour politics and labour troubles without, in many instances, possessing the necessary experience of working conditions to enable them to appreciate the intricacies of the question. I feel confident that the solution to this problem will only be found by close intercourse between the employer and the employed without the assistance or interference of Government departments.

The interests of the two parties are really identical, although the professional agitator would have us believe that the Labour Lamb can never lie down with the Capital Wolf. Throughout the war little has been heard of any real grievance between Labour and Capital; the major portion of unrest has been directly traceable to causes outside the control of the employers.

In order to understand the fundamental difference between the old and new order of labour, it may be briefly summarised as follows:—

1. Trades Unionism in its purest form represents collective bargaining with the employer

(or capitalist) to obtain for the workers the best possible conditions of work and pay, recognising at the same time the status of "master and man".

2. The new movement denies the right of the employer or capitalist to exist, and demands the "workshop for the worker".

It is perhaps an anachronism to speak of "the new movement"; it is really a revival of the doctrine of Karl Marx as delineated in "Zur Kritik der Politischen Oekonomie" (published in 1859) and subsequent works of this advanced German Socialist, embodied in his able but ill-conceived work "Das Kapital". It is worth while studying Marx's works, of which a considerable number of excellent English translations are published, for they form the basis of the modern extreme syndicalism of which Tom Mann is one of the best known present-day exponents.

The Marxian teachings of to-day find expression in the official pamphlets and periodicals issued by the "New Organisation" or "Workers' Committee". This Committee aims at the destruction of legitimate trades unions, desiring to substitute what it calls the "Rank and File Movement," as much as it seeks to destroy the employer and capitalist. Its organisation, which is complete in every detail, even to the appoint-

ment of one shop steward to every fifteen men (or less) in each workshop, is fully explained in a pamphlet * issued this year.

This organisation by itself forms a potential factor of great strength in preventing or postponing a proper understanding between Capital and Labour; but when we come to study the position further we find that the principal organisers are interlocked with various societies, whose teachings and writings during the war give cause for grave concern.

We find the principal organisers of the Rank and File movement in close touch with, or members of, the Union of Democratic Control ("U.D.C.") whose Secretary is the notorious E. D. Morel, "The Clyde Workers' Committee," The Independent Labour Party (I.L.P.), "The Plebeians," "The Pacifists," and a host of others. Further, the official organ of the Rank and File movement has now openly † thrown in its lot with the Industrial Workers of the World (I.W.W.), a society whose methods embrace arson, explosion, and any means of destruction that appear most convenient to attain their ends —i.e. the destruction of employers' property. "One great weapon is sabotage, which means

* "The Workers' Committee: An Outline of its Principles and Structure," by J. T. Murphy, 1917. Price 2d.

† "Solidarity," July, 1917.

doing anything on the job to lessen the master's profits or impede his business. The I.W.W. has developed the lightning strike (coming out without notice); the irritation strike (coming out and going back and so continuing); the staying in strike (folding arms whilst on the job); and other unique but effective weapons. It abides by no legal findings or capitalist morality, having a legal code and morality of its own." *

This open and frank incentive to criminal actions cannot, I feel sure, have the approval or support of the great army of reasonable working men and women of this country, and it is in their power to suppress and condemn such teachings. Unity of purpose and of Empire will never be built on a foundation of crime.

The "Class War" which is being so freely preached and advocated by a considerable section of the people is based upon a complete ignorance of, or wilful blindness to, the basic laws of evolution. "The Socialist who pretends to a deep understanding of his Marx, the academic man who professes a clear comprehension of German intellections—they belong to the same category: they are each of them plain and preposterous liars." †

* "The Industrial Worker," vol. iii., No. 1, October, 1917.
† "The Menace of Peace," by George D. Herron, 1917, p. 64.

And, again, "Even the socialism of Marx is based upon the idea of dominion: the dominion of the many instead of the few; the dominion of social totality over the social units. . . . Marx was not an apostle of freedom: his was not a democratic socialism, but a blended intellectual and proletarian autocracy." *

The fact is, there must always be leaders and the led, there must always be master and man and Capital and Labour. The whole must contrive to arrive at a *modus vivendi* so that each shall have his proper share of the results of his enterprise, industry, and skill, with the common object in view of the betterment of all, and the welfare of the State.

Mistakes have been made in the past and grievous errors have been committed by "Capital" in days that have gone, and these errors must never be made again. In the struggle for world trade that will take place after the war it is vital that a way may be found at once to allow harmonious working between Capital and Labour, so that "Never again should our vital industries be allowed to fall below the scope of all possible requirements; and, as the whole nation is dependent on these industries, so there are other industries upon which part of the nation is ever

* "The Menace of Peace," by George D. Herron, 1917, p. 59.

dependent, and which for that reason alone should be maintained without reference to any other consideration".* Not alone have we to consider our own essential trades; to take our proper place in the world's markets is essential for our well-being as an Empire upon which the sun never sets.

This can only be attained by co-operation and co-ordination; without these we shall rapidly sink, and the great heritage handed to us by our forefathers will crumble into decay. ". . . it is for the rising generation of Englishmen to decide whether in this country the substitution of organised co-operation for anarchical competition shall be brought about consciously and peacefully, or unconsciously and forcibly."†

How are we to attain this end, this co-operation, co-partnership—call it what you will—that all save a small minority are striving after? "The progress of the world waits upon the thought of the majority. How best to educate, clarify, vivify a Nation's collective mind is therefore the one comprehensive problem."‡ Again: "All good citizens . . . all inquirers worthy of the name, are under an imperative

* "The People's Credit," Oswald Stoll, 1916, p. 51.

† "Commercial Crises of the Nineteenth Century," by H. M. Hyndman, 1908, p. 173.

‡ "Scientific Distribution," by C. F. Higham, 1917, p. 9.

obligation to understand the true inwardness of the subject." *

It is evident that our whole future existence depends upon a clear understanding between Capital and Labour: how is this to be brought about and what stands in the way? Remove or break down the barrier of suspicion and distrust, and the rest will easily and naturally follow. That this is a difficult problem is evident, but that it is incapable of solution cannot be admitted. It will take time, and time is precious; but let it be done, for this is the keystone of our tottering edifice. Let the "masters" get together with the "men," and let both sides forget the past and be prepared to meet in a spirit of compromise, with the single purpose in view of the interest of the Empire and the welfare of our great nation. If this should happily be arranged a period of unexampled prosperity for the Empire will ensue; but, should it fail, nothing will avert an industrial war of the gravest magnitude, the outcome of which none may venture to forecast.

In the *post bellum* industrial problems that of "welfare" will take a prominent part, as the condition of the worker both inside and outside

* "History of Socialism" (5th edit., 1913), by Thomas Kirkup, p. 440.

the workshops must be greatly improved, and to this end the experience gained during the war will prove invaluable.

If the information given in this volume proves of assistance to others who have yet to develop their "welfare," the book will not have been in vain.

APPENDICES.

A.—CERTIFICATES OF FITNESS.

Memorandum by the Medical Inspector of Factories, for the Guidance of Certifying Surgeons.

The nature and extent of the personal examination required of the Certifying Surgeon by Section 64 of the Factory and Workshop Act, 1901, to satisfy himself that a child or young person "is not incapacitated by disease or bodily infirmity for working daily for the time allowed by law" or in determining when the certificate should be qualified, has, so far, been left to his discretion. It appears that very considerable variation in the practice of one and another Surgeon exists, naturally leading to complaint of undue stringency of some and laxity of others.

Without laying down definite rules or prescribing a schedule, useful purpose may be served by indicating some medical points which should be borne in mind when making the examinations required by the instructions (see pars. 14-32). They pre-suppose adequate privacy.

They are:—

(1) Auscultation of the heart and presence or absence of anæmia.
(2) State of the glands in the neck.
(3) Condition as regards tonsils and adenoids.
(4) Condition of the teeth.
(5) Infectious or contagious diseases including pediculi capitis.

(6) Physical development.
(7) Mental condition.
(8) Hearing.
(9) Vision.

If defects under these heads were borne in mind in determining, in the particular process, the question of (1) rejection, or, (2) attaching conditions to the certificate, approximation to uniformity of practice would result. The objects to be aimed at in the examination have been well stated * by an eminent Certifying Surgeon as :—

1. Avoidance of injury of the health, development, or bodily capacity of the individual inspected.
2. Protection to the fellow-workers, of whatever age or sex.
3. Maintenance of legality : this directly protects the employer.
4. Checking unfair competition, and protecting the more conscientious manufacturers from the less scrupulous.

While many Certifying Surgeons examine the heart in every case, sometimes with the chest bared, others state they do so only when it is suggested by the appearance of the person presented or by statements as to previous illness such as rheumatic fever. Cases have recently been investigated where serious congenital heart disease has been missed from failure to examine the heart as a matter of routine, and it is therefore urged that this be done. Gross lesions, if found, would usually call for action on the part of the Surgeon.

Anæmia must necessarily be a frequent cause of rejection, especially in girls, where the work necessitates standing or is heavy. The possibility too of fainting when

* C. A. Greaves, M.B., LL.B., "The Granting of Certificates of Fitness to Children and Young Persons employed in Factories and Workshops" ("British Medical Journal," 13th September, 1902).

working, for instance, among textile machinery, must not be forgotten.

On factory premises physical examination of the lungs must, in general, be confined to cases where other clinical signs suggesting tubercular infection are present, notably the condition of the glands in the neck. These, if discharging, should constitute a sufficient cause for rejection from indoor employment. Certifying Surgeons have already been informed that they are justified in rejecting a child or young person presenting distinct physical signs of incipient phthisis if, at the time of examination, there is no actual inability to work for the full time allowed by law provided the Surgeon is satisfied the proposed employment for the full legal period would be prejudicial to health.

Enlargement of the tonsils alone can rarely be a cause for rejection, and even when adenoids are obviously present also the Surgeon would require to be satisfied by effect of the associated condition shown in the physical development of the child or young person as to the unfitness for employment before rejection. Occasionally in crowded workrooms risk of spreading catarrhal infection from this condition may have to be weighed, but in the great majority of cases of enlarged tonsils and adenoids the Certifying Surgeon's action is likely to be limited to advice tendered, note being made in the General Register to call attention to what he has done. Dust, artificial humidity, and extreme change of temperature on leaving work are all points to be borne in mind as pre-disposing causes to affections of the upper air passages and lungs.

Similarly nothing but good can result from calling attention to remediable conditions in persons presented suffering from bad teeth and oral sepsis. When the Certifying Surgeon is satisfied that owing to the state of health consequent upon them the proposed employment would be injurious to the applicant or would entail risk of infection to others, it would be within his discretion either to refuse

the certificate or grant one subject to conditions. The Act, however, does not warrant refusal of a certificate for employment for which the applicant is physically fit and can undertake without prejudice to his own health or that of others. The certificate should not therefore be refused merely on the ground that certain treatment or regimen is desirable apart from the proposed occupation; there must be unfitness for that occupation. This limitation does not debar the Certifying Surgeon from calling attention to such matters, but the advice cannot be enforced by refusal of the certificate on grounds other than those which the Acts contemplate.

Many Certifying Surgeons are rightly taking a strong line in rejecting for *pediculi capitis* and the eczematous condition and enlarged glands associated with them when no effort was being made at eradication. In some factories, in order to minimise rejections from this cause, printed slips are issued to the children and young persons before the Surgeon's visit, of which the following may be taken as an example :—

"In order to pass the Doctor it is necessary to have the head very clean. The following is a good method of cleaning *the hair* :—

"(1) The hair to be well combed with a small tooth comb.

"(2) Wash the hair with carbolic soft soap.

"(3) Then soak the hair in brown vinegar and water, equal parts. Then tie the hair up in a towel for half an hour.

"(4) Rinse well with hot water and borax.

"(5) Do not fail to use the vinegar."

In districts where half-time employment prevails the advantage of co-operation between the Certifying Surgeon and the School Medical Officer is perhaps more obvious in dealing with this condition than any other.

In certain instances the small size of a child has been

entered as a sufficient reason for refusing to grant a certificate of fitness. Without an examination of the heart and lungs, and estimation of the muscular and fatty covering of the chest wall it is impossible reasonably to reject a child on account of his or her physique.

In considering the size of a child as a cause of rejection, regard must be had to the work the child is called upon to do, and in this respect it is to be noted that, in the case of a cotton mill, for example, the overlooker, who engages the child in the first place, will not employ a child if he is too short, as he is unable to do the work. And the work upon which these children are engaged there, (1) sweeping, (2) cleaning, (3) creeling, (4) tubing, (5) piecing, (6) doffing, and (7) bobbin sorting and collecting, is generally speaking of a very light character. Where, as in some mills, a certain amount of lifting or dragging tins or skips is done, such work can be qualified by conditions attached to the certificate. Even if the weight of a child is taken, and is found to be low, the child should not necessarily be refused, because unless a definite standard is fixed, the relation of weight to height being taken into account, it may become arbitrary. Weight has a relationship to size and the short and wiry child, who weighs little, might be better suited to the work than the tall and flabby; particularly when working, as in cotton mills children do, in rooms with a high temperature. At the present time no such standard can be arrived at which would serve as a basis for refusal to grant certificates of fitness.

In dealing with the question of rejecting children because they are badly nourished the home circumstances of the child must be taken into account before rejection is decided upon. Bad nutrition may be due to actual want of food which is improved when the child becomes a wage earner.

No doubt practical experience enables a Certifying Surgeon to pick out unhealthy children by inspection, but a

further examination such as auscultation of the heart and the apices of the lungs carries more weight and certainly reveals grosser lesions. Height and weight below normal need not necessarily be regarded as causes for rejection of children to be employed, for example, as "little piecers," provided that after examination no organic disease is found. Nutrition below normal, regard being had to the home conditions, would not appear by itself to be a sufficient reason for refusing to grant a certificate of fitness. On the other hand mal-nutrition accompanied by marked anæmia might reasonably justify rejection. Such cases might improve after a period of rest and treatment, and subsequently be in a condition to allow of a certificate being granted.

Knowledge of the standard arrived at on leaving school helps in determining the mental alertness of the child or young person. The Certifying Surgeon should bear in mind the special Acts dealing with defective and epileptic children which require the Local Education Authority to make suitable provision for the education of such children up to the age of sixteen years.

Detection of mental defect should raise in the Surgeon's mind the question of possible removal from school in contravention of the Act mentioned and weigh with him in deciding as to the granting of a certificate of fitness. A history of epilepsy or evidence of chorea should always be a bar to work near machinery.

Deafness renders certain kind of work (e.g. in a mule spinning room) more risky, but the condition is one unlikely to cause rejection. The Surgeon, however, should note whether otorrhœa is present as this may seriously endanger fitness for employment and cannot be passed over without a warning to the child or young person.

Defective eyesight is rightly a frequent cause of rejection, and in all cases of close work or of employment on machinery the surgeon should satisfy himself that the work can be done without undue eyestrain before granting a

certificate. Monocular vision due to strabismus, loss of one eye, etc., should almost always be a bar to work near machinery. Further, children thus afflicted, if employed on piece work involving close attention, rarely become adept or earn the wages they expect to. In the potteries, to prevent lead poisoning being contracted from undue proximity to the work, a test type has been drawn up for use by the Surgeons, a copy of which is enclosed. Ability to read D = 1·75 on the card supplied at one metre distance lies between $\frac{6}{9}$ and $\frac{6}{12}$. The card may be useful as some guide as to when glasses are needed before a certificate can be granted for close work or work near machinery.

For a series of years (1906 to 1913) in addition to publication in the Annual Report of the number of rejections on medical grounds, attempt was made to analyse, from the reports of such Certifying Surgeons as recorded them, the conditional certificates granted and advisory notes made according to (1) the nature of the defect, and (2) the kind of work forbidden or allowed. That for the year 1913 is reprinted at the end of this memorandum.

During the present war the hours of work are extended beyond the normal period in a number of factories, and an extra strain may thus be thrown on young and inexperienced workers.

The revised form of the General Register, in which it is no longer necessary to record the names of the parents, and with ample space provided for entry of conditions attached to certificates (or statement of advice given) should lead to full use being made of this power conferred by the 1901 Act, and allow more time to be given to personal examination of the children and young persons.

Reference has been made to co-operation with the School Medical Officer. Other local agencies with which it would be well for the Certifying Surgeon to try and keep in touch, where they exist, are the Juvenile Employment Committee constituted under the Education (Choice of Employment)

CONDITIONS OR ADVICE ATTACHED

Compiled from Particulars Supplied

Work Forbidden.	Imperfect Growth.	Physical Defect (243), Deformity (27), Rickets (11), Disease of Spine (24), of Hip (17), Infantile Paralysis (15).	Mental Defect (15), Epilepsy (27), Chorea (13).	Defective Vision (1,117), Errors of Refraction (24), Loss of, or Blind in one Eye (63), Strabismus (7).	Blepharitis (41), Ophthalmia (2), Conjunctivitis (4).	Deaf (102), Otorrhœa (4), Deaf-mutism (3).	Heart Disease.	Anæmia (145), Debility (295), Defective Strength (12).
At or near machinery	64	51	47	427	—	87	37	9
Unless hair tied up	—	—	—	—	—	—	—	—
At treadle machines	10	2	—	—	—	—	7	1
Heavy work	87	106	1	—	—	—	39	278
Lifting or carrying weights	134	54	1	—	—	—	199	37
Carrying beyond specified weights	416	4	—	—	—	—	9	1
Standing work	29	32	—	—	—	—	5	2
Amongst dust	—	—	—	6	34	—	—	—
Poisonous materials	—	—	—	—	—	—	—	—
Moist, hot work	—	—	—	3	1	—	—	1
Fine work, and work without glasses	—	—	—	581	—	—	—	—
Unless treated for defect	—	2	—	30	2	9	—	15
Unless re-examined	—	36	—	—	1	—	—	3
,, supervised	—	—	1	—	—	—	—	—
Label licking	—	—	—	—	—	—	—	—
With food products	—	—	—	—	—	—	—	—
Spinning	—	—	—	2	—	—	—	7
Weaving	81	6	3	52	9	—	—	37
Doffing	12	—	—	—	—	—	1	3
All except doffing	1	—	—	—	—	—	—	—
,, reaching in	30	5	—	—	—	12	12	—
,, knotting	3	5	—	85	—	—	—	—
,, work at twist mills	27	—	—	—	—	—	—	—
All except ring spinning	52	—	—	—	—	—	—	—
All except other defined work in cotton mills	15	6	—	2	—	—	1	11
Bobbin carrying	—	—	—	—	—	—	—	1
Reaching in	—	—	—	15	—	—	—	—
Carrying kops	—	2	—	—	—	—	—	10
In glasshouse	49	—	—	2	—	—	—	—
Beyond certain hours	16	1	1	—	—	—	—	8
All except errands	20	1	—	2	—	—	1	—
,, outdoor work	—	—	—	—	—	—	—	2
All except warehouse work	7	3	—	3	—	—	2	2
All except specified light work	44	18	—	1	—	1	6	8
All except work on ground floor	—	—	1	—	—	—	—	15
Bronzing	—	—	—	—	—	—	—	1
Totals	1,097	337	55	1,211	47	109	319	452

TO CERTIFICATES OF FITNESS—1913.

by 188 *Certifying Surgeons.*

Phthisis (57), Bronchitis (34), Weak Chest (13), Catarrh (41).	Adenoids, Tonsils and Enlarged Glands.	Eczema (2), Pediculosis (206), Uncleanliness (90), Skin Diseases (37).	Nail Biting.	Long Loose Hair (1,821), Ragged Clothing (8).	Unsuited to do the Work.	Too Young.	Injuries to Hand.	Carious Teeth (51), Hernia (9), Other (15).	Indefinite.	Total.
—	3	—	—	175	—	1	1	—	9	914
—	—	—	—	1,646	—	—	—	—	—	1,646
—	—	—	—	—	—	13	—	—	—	33
5	—	—	—	—	—	3	—	1	—	520
2	—	—	—	—	16	11	—	9	2	465
—	—	—	—	—	—	8	—	—	—	438
59	—	—	—	—	—	—	—	—	—	68
—	—	—	112	—	8	—	—	—	—	99
4	13	—	—	—	—	—	—	—	—	120
—	—	—	—	—	—	—	—	—	—	22
—	—	—	—	—	—	—	—	—	—	581
10	75	309	—	8	—	—	—	58	—	518
—	—	—	—	—	—	—	—	1	91	132
—	—	—	—	—	25	—	—	—	—	1
—	—	5	—	—	—	—	—	—	—	25
—	—	—	—	—	—	—	—	—	—	5
8	—	—	—	—	—	—	—	3	—	9
—	—	—	—	—	—	—	—	—	—	199
—	—	—	—	—	—	69	—	—	—	16
1	—	—	—	—	—	—	—	1	—	70
—	—	—	—	—	—	—	—	—	—	61
—	—	—	—	—	—	—	—	—	—	93
—	—	—	—	—	—	—	—	—	—	27
—	—	—	—	—	—	—	—	—	—	52
4	4	—	—	—	—	—	—	1	—	44
—	—	—	—	—	—	—	—	—	—	1
—	—	—	—	—	—	—	—	—	—	15
—	—	—	—	—	—	—	—	—	—	12
—	—	—	—	—	—	—	—	—	—	51
—	—	—	—	—	11	—	—	—	—	37
—	1	—	—	—	—	—	12	1	—	38
32	6	—	—	—	—	—	—	—	1	41
20	—	21	—	—	—	—	—	—	—	58
—	—	—	—	—	3	2	1	—	—	84
—	—	—	—	—	—	—	—	—	—	16
—	—	—	—	—	—	—	—	—	—	1
145	102	335	112	1,829	63	107	14	75	103	6,512

Act, or the special Advisory Committee formed under the Labour Exchanges Act. The Secretary of this Committee is often furnished with particulars as to the physique, hearing, and sight of each applicant from the School Medical Officer's records. The field of co-operation between the Certifying Surgeon and School Medical Officer would be largely covered if on the one hand the Certifying Surgeon were furnished with the names of "leavers" suffering from serious defect (heart disease, incipient phthisis, mental defect and markedly impaired vision) who were likely to be seeking employment in his district, and, on the other, if the Certifying Surgeon supplied information of his rejections to the School Medical Officer for "following up" purposes or in order that suitable employment might be found.

Such co-operation at present is more feasible in districts served by one Certifying Surgeon than in large centres of industry, because in the latter, difficulties arise not so much perhaps from the number of defective "leavers" as from inability to obtain precise information of the place of employment.

After the war, the need for safe-guarding the health of the rising generation will be greater than ever and calls for every effort being made to secure the co-operation of all the agencies at work which may be effective in securing this. The Certifying Surgeon should remember he has often the chance of addressing the first word of encouragement to the child in his start on industrial life.

FACTORY DEPARTMENT,
HOME OFFICE, *December*, 1915.

B.—SANITARY ACCOMMODATION.

The Sanitary Accommodation Order of 4th February, 1903.

In pursuance of Section 9 of the Factory and Workshop Act, 1901, I hereby determine that the accommodation in the way of sanitary conveniences provided in a factory or workshop shall be deemed to be sufficient and suitable within the meaning of the said section if the following conditions are complied with and not otherwise:—

1. In factories or workshops where females are employed or in attendance there shall be one sanitary convenience for every 25 females.

In factories or workshops where males are employed or in attendance there shall be one sanitary convenience for every 25 males; provided that—

(*a*) in factories or workshops where the number of males employed or in attendance exceeds 100, and sufficient urinal accommodation is also provided, it shall be sufficient if there is one sanitary convenience for every 25 males up to the first 100, and one for every 40 after;

(*b*) in factories or workshops where the number of males employed or in attendance exceeds 500, and the District Inspector of Factories certifies in writing that by means of a check system, or otherwise, proper supervision and control in regard to the use of the conveniences are exercised by officers

specially appointed for that purpose it shall be sufficient if one sanitary convenience is provided for every 60 males, in addition to sufficient urinal accommodation. Any certificate given by an Inspector shall be kept attached to the general register, and shall be liable at any time to be revoked by notice in writing from the Inspector.

In calculating the number of conveniences required by this order, any odd number of persons less than 25, 40, or 60, as the case may be, shall be reckoned as 25, 40, or 60.

2. Every sanitary convenience shall be kept in a cleanly state, shall be sufficiently ventilated and lighted, and shall not communicate with any work-room except through the open air or through an intervening ventilated space; provided that in work-rooms in use prior to 1st January, 1903, and mechanically ventilated in such manner that air cannot be drawn into the work-room through the sanitary convenience, an intervening ventilated space shall not be required.

3. Every sanitary convenience shall be under cover and so partitioned off as to secure privacy, and if for the use of females shall have a proper door and fastenings.

4. The sanitary conveniences in a factory or workshop shall be so arranged and maintained as to be conveniently accessible to all persons employed therein at all times during their employment.

5. Where persons of both sexes are employed, the conveniences for each sex shall be so placed or so screened that the interior shall not be visible, even when the door of any convenience is open, from any place where persons of the other sex have to work or pass; and, if the conveniences for one sex adjoin those for the other sex, the approaches shall be separate.

6. This order shall come into force on the 1st day of July, 1903.

7. This order may be referred to as the Sanitary Accommodation Order of 4th February, 1903.

A. AKERS-DOUGLAS,
One of His Majesty's Principal Secretaries of State.

HOME OFFICE, WHITEHALL,
4th February, 1903.

C.—MEMORANDUM AS TO WASHING CONVENIENCES.

SECTION 75[1] of the above Act requires that :—

> "in every factory or workshop where lead, arsenic or other poisonous substance is used, suitable washing conveniences shall be provided for the use of persons employed in any department where such substances are used";

and renders the occupier liable to a fine not exceeding £10 if such conveniences are not provided.

In certain works the accommodation to be provided is prescribed in detail by Regulations or Special Rules for Dangerous Trades. Elsewhere the points requiring attention are as follows :—

The washing conveniences should be under cover, and maintained in a cleanly state and in good repair.

There should be either :—

(*a*) a trough with a smooth impervious surface, fitted with a waste pipe without plug, and of such length as to allow at least 2 feet for every five persons, and having a constant supply of warm water from taps or jets above the trough at intervals of not more than 2 feet; or

(*b*) at least one lavatory basin for every five persons, fitted with a waste pipe and plug or placed in a trough having a waste pipe, and having either a constant supply of hot and cold water or warm water laid on, or (if a constant supply of heated

water be not reasonably practicable) a constant supply of cold water laid on and a supply of hot water always at hand when required for use by persons employed.

There should also be a sufficient supply of clean towels, soap, and nail brushes.

FACTORY DEPARTMENT,
HOME OFFICE, *February*, 1911.

D.—FACTORY AND WORKSHOP (WELFARE).

ORDER, DATED OCTOBER 12TH, 1917, MADE BY THE SECRETARY OF STATE UNDER SECTION 7 (1) OF THE POLICE, FACTORIES, ETC. (MISCELLANEOUS PROVISIONS) ACT, 1916, IN REGARD TO AMBULANCE AND FIRST AID ARRANGEMENTS AT BLAST FURNACES, COPPER MILLS, IRON MILLS, FOUNDRIES, AND METAL WORKS.

In pursuance of Section 7 of the Police, Factories, etc. (Miscellaneous Provisions) Act, 1916, I hereby make the following Order, and direct that it shall apply to all factories in the following classes :—

Blast Furnaces.
Copper Mills.
Iron Mills.
Foundries.
Metal Works.

First Aid.

1. In every factory to which this Order applies and in which 25 or more persons are employed, the occupier shall provide, in readily accessible positions, "First Aid" boxes or cupboards in the proportion of at least one to every 150 persons.

In calculating the number of "First Aid" boxes or cupboards required under this provision any odd number of persons less than 150 shall be reckoned as 150.

2. Each "First Aid" box or cupboard shall be marked plainly with a white cross on a red ground, and shall contain at least :—

(i) A copy of the First Aid Leaflet issued by the Factory Department of the Home Office.
(ii) Three dozen small size sterilised dressings for injured fingers.
(iii) One dozen medium size sterilised dressings for injured hands or feet.
(iv) One dozen large size sterilised dressings for other injured parts.
(v) One bottle of eye-drops, and
(vi) Sterilised cotton wool.

3. Nothing except appliances or requisites for First Aid shall be kept in a "First Aid" box or cupboard.

4. Each "First Aid" box or cupboard shall be kept stocked and in good order and shall be placed under the charge of a responsible person who shall always be readily available.

A notice or notices shall be affixed in every workroom stating the name of the person in charge of the box or cupboard provided in respect of that room.

Ambulance Room.

5. In every factory to which this Order applies and in which 500 or more persons are employed, the occupier shall provide an Ambulance room.

6. The Ambulance room shall be a separate room used only for the purpose of treatment and rest. It shall have a floor space of not less than 100 square feet and smooth, hard and impervious walls and floor, and shall be provided with ample means of natural and artificial lighting. It shall contain at least—

(i) A glazed sink with hot and cold water always available.
(ii) A table with a smooth top.
(iii) Means for sterilising instruments.

(iv) A supply of suitable dressings, bandages, and splints.

(v) A couch.

(vi) A stretcher.

7. Where persons of both sexes are employed, arrangements shall be made at the Ambulance room for their separate treatment.

8. The Ambulance room shall be placed under the charge of a qualified nurse, or other person, trained in First Aid, who shall always be readily available and shall keep a record of all cases of accident and sickness treated at the room.

Ambulance Carriage.

9. At every factory to which this order applies and in which 500 or more persons are employed, the occupier shall, for the purpose of the removal of serious cases of accident or sickness, provide on the premises and maintain in good condition a suitably constructed ambulance carriage, unless he has made arrangements for obtaining such a carriage when required from a hospital or other place in telephonic communication with the factory.

10. This order shall come into force on the 1st December, 1917.

One of His Majesty's Principal Secretaries of State.

HOME OFFICE,
WHITEHALL, *October 12th*, 1917.

E.—FIRST AID.

Treatment of Minor Injuries.

The following suggestions have the approval of H.M. Medical Inspectors of Factories in rendering first aid in factories and workshops so as to prevent subsequent septic infection or blood poisoning.

A Scratch or Slight Wound.

Do not touch it.

Do not bandage or wipe it with a handkerchief or rag of any kind.

Do not wash it.

Allow the blood to dry and so close the wound naturally ; then apply a sterilised dressing and bandage.*

If bleeding does not stop, apply a sterilised dressing and sterilised wool, then bandage firmly.

If the wound is soiled with road dirt or other foul matter, swab freely with wool soaked in the iodine solution † and allow the wound to dry before applying a sterilised dressing.

A Burn or Scald.

Do not touch it.

Do not wash it.

Do not apply oil or grease of any kind.

Wrap up the injured part in a large dressing of sterilised wool.†

* Minute wounds can be efficiently closed by applying collodion.

† An alcoholic solution containing 2 per cent of iodine.

An Acid Burn.

Do not touch it.

Do not apply oil or grease of any kind.

Sprinkle the burn with powdered bicarbonate of soda.

Apply a sterilised burn dressing of suitable size.*

However slight the burn, if the area affected is extensive a doctor must be consulted.

Do not remove any dressing, but, if the injured part becomes painful and begins to throb, go to a doctor at once.

Destroy all dressings which have been opened but not used; they soon become infected with microbes and then are not safe to use.

Eye Injuries.

A Foreign Body.—Apply the eye drops, Solution No. 1,† to the affected eye-ball by means of the camel-hair brush in the bottle.

Do not try to remove any particle which cannot be brushed away.

Tie up with a clean handkerchief or bandage.

Go to a doctor *at once.*

An Acid Burn.—Brush the affected eye-ball thoroughly with Solution No. 2.‡

* This would not exclude treatment by prepared paraffin or picric acid.

† Solution No. 1: Cocaine . . . . 0·5 per cent
Hyd. Perchlor. in castor oil 1 in 3000.

‡ Solution No. 2: Sodium bicarbonate, 15 grains; water, 1 ounce.

Instructions to chemist for making eye drops: Weigh 95 grammes of castor oil into a flask capable of holding twice the quantity. Add 0·5 gramme of powdered cocaine. Warm on a water bath till dissolved. While the solution is still warm (but not hot) add one cubic centimetre of a solution containing 3·3 grammes of mercuric chloride in 100 cubic centimetres of absolute alcohol. Mix the solutions by rotating the flask.

About half an ounce, or 15 c.c., of this solution should be

Then apply Solution No. 1 in the same way.

Apply an eye-pad and tie up with clean handkerchief or bandage.

Go to a doctor *at once*.

Prevention is better than cure; therefore, if your work entails danger to the eyes, wear goggles.

Goggles have saved hundreds of eyes; *thousands* have been lost for want of them.

NOTE.—Danger from minor injuries arises from blood poisoning which is caused when microbes infect a wound. The majority of wounds are at first "clean," that is they are not infected with microbes; such infection usually occurs later and comes from handkerchiefs or other materials applied to stop bleeding or to wipe away blood, and, in the case of eye injuries, from efforts to remove fixed particles with unclean instruments. *It is better to leave a wound alone than to introduce microbes by improper treatment.* The congealing of blood is Nature's way of closing wounds against infection, and should not be interfered with.

Burns and scalds when the skin is not broken will heal if left alone; all that is necessary is rest and a protective covering. When blisters form they must not be pricked, except under medical advice.

Rest is an important aid to healing. A short rest at first allows healing to commence and often saves a long rest later. An injured hand or finger can be rested in a sling, and an injured eye by a bandage, but an injured foot or toe can only be rested in bed.

supplied in a bottle from the cork of which a camel-hair brush is pendent in the fluid.

[The Secretary of State has issued a general permit to occupiers under the Defence of the Realm Regulations, 40 B, to purchase this preparation on condition that it is used for the purpose specified and no other and that it is kept in the custody of the occupier or of a responsible official nominated in writing by him.]

Eczema From Lubricating Oil.

Dermatitis and eczema from oils and fluids used to lubricate and cool metals can best be prevented by cleanliness of (1) the overalls, and (2) the skin. All overalls should be washed weekly; and the hands and forearms daily in warm water before leaving the factory. Lanoline and castor oil ointment (equal parts) applied to the skin after washing is a help. When dermatitis and eczema occur washing should be stopped and a doctor seen at once.

F.—FACTORY AND WORKSHOP (WELFARE).

ORDER, DATED OCTOBER 9TH, 1917, MADE BY THE SECRETARY OF STATE UNDER SECTION 7 (1) OF THE POLICE, FACTORIES, ETC. (MISCELLANEOUS PROVISIONS) ACT, 1916, IN REGARD TO THE SUPPLY OF DRINKING WATER AT CERTAIN FACTORIES AND WORKSHOPS.

In pursuance of Section 7 of the Police, Factories, etc. (Miscellaneous Provisions), Act, 1916, I hereby make the following Order, and direct that it shall apply to all factories and workshops in which 25 or more persons are employed.

1. In every factory or workshop to which this Order applies the occupier shall provide at suitable points, conveniently accessible at all times to all persons employed—

(*a*) an adequate supply of wholesome drinking water from a public main or from some other source of supply approved in writing by the local authority of the district in which the factory or workshop is situated, which shall be either laid on or contained in a suitable vessel;

(*b*) (except where the water is delivered in an upward jet from which the workers can conveniently drink) sufficient cups or other suitable drinking vessels, with facilities for rinsing them in drinking water.

Each drinking water supply shall be clearly marked "Drinking Water".

2. All practicable steps shall be taken to preserve the water and vessels from contamination.

3. This order shall come into force on the 1st December, 1917.

One of His Majesty's Principal Secretaries of State.

HOME OFFICE,
WHITEHALL, *October 9th*, 1917.

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PRINTED IN GREAT BRITAIN BY THE UNIVERSITY PRESS, ABERDEEN